Arab Republic of Egypt
Ministry of Education
Book Sector

Search and Learn Science

2015-2016

For Primary Stage

Year 4

Second Term

غير مصرح بتداول هذا الكتاب خارج وزارة التربية والتعليم

مطابع ول إنجنيرينج إنتربرايز

Arab Republic of Egypt
Ministry of education
The Book Sector

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مقدمةٌ

عزيزى التلميذ / التلميذة

يسعدنا ونحن نقدم هذا المنهج لأبنائنا تلاميذ الصف الرابع الابتدائى أن نؤكد على أن تعلم العلوم متعة وبهجة، متعة فى القيام ببعض الأنشطة العلمية البسيطة، وبهجة فيما يمكن الوصول إليه من نتائج. فتعلم العلوم يعتمد على الملاحظة والتفكير والتجربة واستخلاص النتائج. وقد تم اختيار عنوان لهذا المنهج يعكس فلسفته؛ وهو **«ابحث وتعلم»**.

وقد شارك فى إعداد هذا المنهج مجموعة من المتخصصين فى المناهج وطرق تدريس العلوم والخبراء والموجهين والمعلمين، **كما تم فيه تجربة الاستعانة بمجموعة من تلاميذ المرحلة المستهدفة تأكيدًا لفلسفة المنهج من حيث مراعاة طبيعة المرحلة العمرية وطبيعة المعرفة والمجتمع**.

ويهدف هذا المنهج إلى مساعدة التلميذ على إدراك العلاقة بين العلم والتكنولوجيا ورؤية العلم من منظور شخصى ومجتمعى وفهم تاريخ وطبيعة العلم وتنمية مهارات التفكير العليا وامتلاك المفاهيم العلمية الأساسية. ولتحقيق هذه الأهداف تم استخدام أسلوب علمى تقدم فيه المفاهيم فى شكل وحدات دراسية فى ترابط منطقى مع بعضها البعض وتكامل مع المواد الدراسية الأخرى. كما أن الموضوعات المتضمنة فى هذا المنهج تتناول المفاهيم الرئيسية فى مجالات الكائنات الحية والمادة والطاقة والفلك مما يساعد على تشجيع البحث والاستقصاء العلمى.

ويتضمن الفصل الدراسى الثانى وحدتين لكل منهما عنوان يدل على محتواها. فقد جاءت الوحدة الأولى بعنوان الكائنات الحية والوحدة الثانية بعنوان القوة والطاقة. وتشمل كل وحدة مجموعة دروس مترابطة ومتكاملة.

ويعتمد المنهج على إثارة رغبة التلاميذ والتلميذات فى المعرفة والتعلم، والاستفادة من الخبرات المحيطة بهم من كل جانب وذلك من خلال الاعتماد على الأنشطة والتدريبات المتنوعة. كما يعتمد المنهج على استراتيجيات التعلم النشط فى تنفيذ دروسه، ولذلك تم تزويد الدروس بمصادر المعرفة ووسائل التكنولوجيا الحديثة بما يشجع مهارات البحث والتعلم الذاتى وتنمية مهارات التفكير الناقد ومساعدة التلميذ على التأمل والتقييم الذاتى فيما يدرسه ويتعلمه، وتكوين ملف الإنجاز الخاص به بما يتفق وفلسفة التقويم الشامل.

ونحن إذ نقدم هذا الكتاب نرجو الله أن يحقق الفائدة منه.

والله ولى التوفيق

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Unit One

Living Things

- Structure and function in living organisms.
- Levels of Organization in organisms bodies.
- Energy paths in environmental systems.

Unit Lessons

1- Human Digestive System
2- Human respiratory System.
3- The Cell ..The building unit of Living organism .
4- The importance of sunlight To living organisms.
5- Energy paths through living Organisms.

Living organisms depend on each other in the environmental systems.

Objectives

By the end of this unit, a student will be able to:

1. Name some systems of the human body.
2. Name the Biological functions of the human body systems.
3. Infer the integration among the living organism body systems.
4. Examine a model for the digestive and respiratory systems.
5. Identify the functions of digestive and respiratory systems organs.
6. Show the importance of a human keeping to his body.
7. Have his classmates conduct right behaviors in feeding.
8. Identify the levels of organization of the living organism body.
9. Show that the cell is the building unit of living organisms.
10. Examine the animal and plant cells.
11. Compare an animal cell to a plant one.
12. Use the magnifying lens and Compound microscope for examining cells.
13. Explain the role of the sun in photosynthesis process.
14. Infer the relation of living organisms with each other.
15. Order food chains in different environments.
16. Compare the food chains to the food webs.

1 LESSON ONE

Human Digestive System

Lesson Objectives

By the end of the lesson, a student will be able to:

1. Identify some human body systems and their importance.
2. Recognize the concept of digestion.
3. Name the digestive system organs.
4. Determine the function of each organ of the digestive system.
5. Identify the function of the digestive juices.
6. Conclude the role of digestive juices.
7. Examine a digestive system preliminary model (torso).
8. Draw a simplified diagram for the digestive system.
9. Show the importance of food for human body.
10. Give suggestions to his classmates in order to keep their digestive systems healthy.

Lesson Items

- Studying some human body systems.
- Digestive system structure.
- Digestive system functions.

Life Issues

- General health

We are surrounded by countless number of living things which all have common properties and characteristics such as nutrition, transport, respiration, excretion, motion, sensation, reproduction ..These properties are performed via specialized systems within the living organism body to assist his existence and survival.

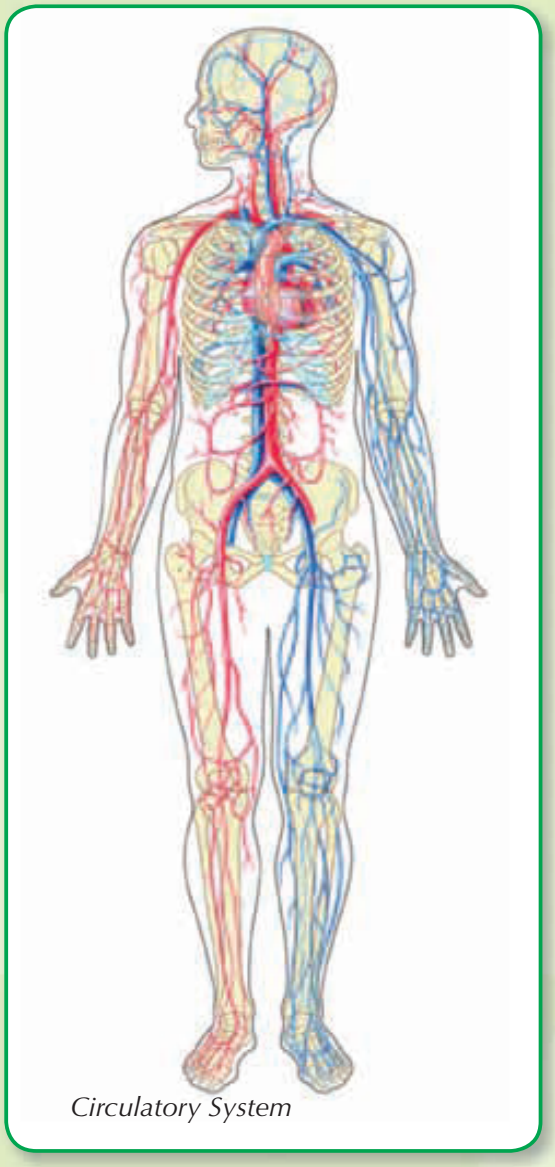
The structure of the living organism body

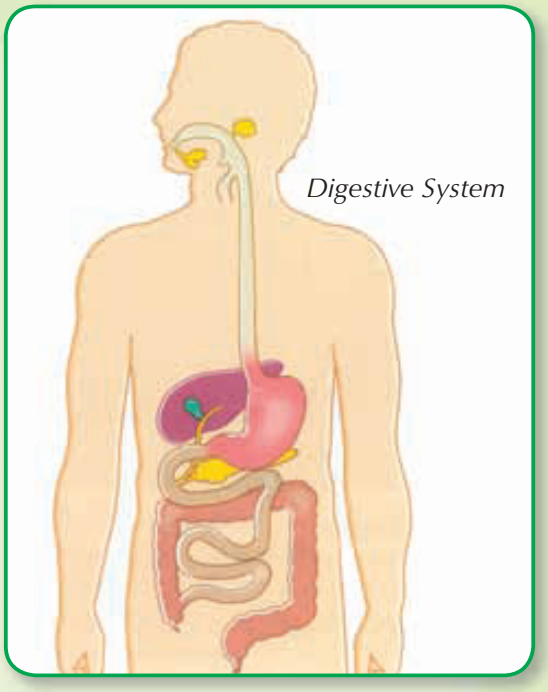
A living organism body consists of a set of systems, these systems can be obviously shown through the studying of some human body systems.

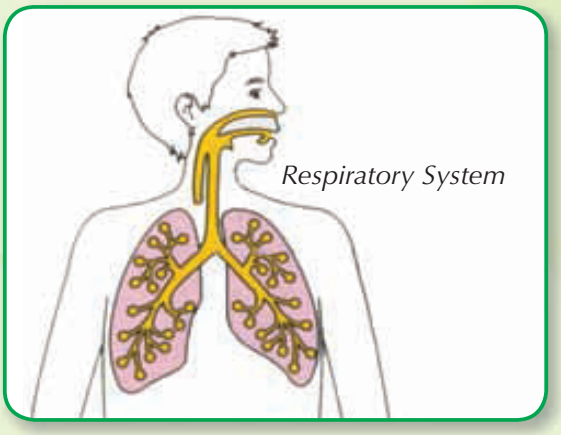
Activity (1) Human Body Systems

Work with your classmates using some photos to the human body systems then write the name of the suitable system in front of its proper function to complete the following table.

	Function	System's name
1	Nutrition and Digestion	..... system
2	Transport	..... system
3	Respiration	..... system


Circulatory System


Digestive System


Respiratory System

The human body is made up of a number of systems. Each system performs a certain function. For example, the digestive system digests and absorbs food, the respiratory system carries out the process of breathing and the circulatory system distributes the digested food and oxygen all over the body cells. The urinary system helps the body get rid of harmful substances, the nervous system lets us have the ability to feel, hear, see, smell, and taste, where as the reproductive system makes us give birth for new individuals who will look like us. And all these systems are working in full harmony and integrity together to keep the human life goes on.

Let's study the digestive system together to know How this system are structured.

The Human Digestive System

When you sit with your classmates having your breakfast.....

Have you ever asked yourself where this food goes? And what is happening to it?

.....

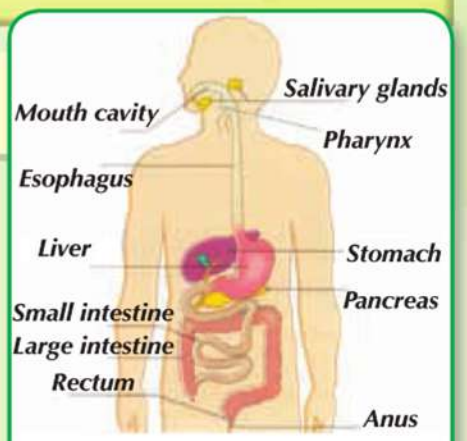
.....

The food you have had such as bread, cheese, jam and beans is in a complex form. During its journey through the digestive system, it completely changes into a simple form to let your body be benefited.

Digestion: Changing the food from a complex form into a simple one to let the body get benefited.

Activity (2): Digestive System Structure

The opposite figure shows the digestive system. Recognize its contents then write them down.



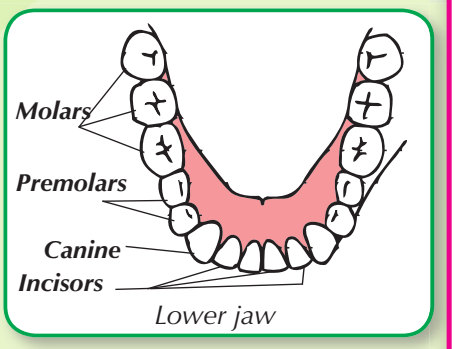
Digestive system in human being

1. ..... 2. ..... 3. .....
4. ..... 5. ..... 6. .....
7. ..... 8. ..... 9. .....
10..... 11..... .....

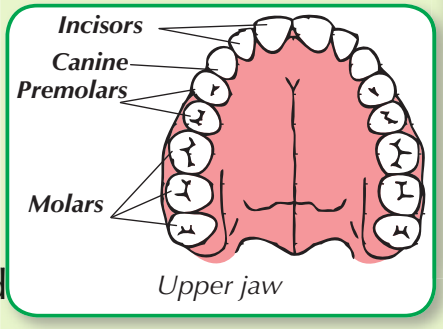
Digestive system in a human being is made up of a set of organs which contact with each other in a shape of a long pipe (duct) known as the digestive canal with length of 9 - 10 m. This canal starts with the mouth and ends in the anus. Three types of glands are connected with this canal: the salivary glands, the liver and the pancreas, These glands are called the digestive canal supplementaries.

(1) Mouth

The mouth is a cavity in where teeth and tongue are existed and the salivary glands open to it as well.



Lower jaw



Upper jaw

• Teeth

The teeth number in an adult are 32, each jaw has 16 teeth divided into (4 incisors, 2 canines and 10 molars).

- Incisors and canines cut and tear food into small pieces, where molars grind the food to ease its swallowing process.

• Tongue

It turns food inside the mouth cavity and mixes it up with saliva assisting the process of food swallowing and tasting.

• Salivary glands

They are three pairs of glands secrete a liquid known as the saliva which contains digestive substances called enzymes that digest starches, then convert them into simpler substances known as sugars.

Read and Learn

Milk teeth:

Are weak teeth, formed through the childhood phase in a number of 20 teeth (ten teeth in every jaw, divided into 4 incisors, 2 canines and 4 molars). These teeth are completely replaced by strong ones before the age of twelve.

Read and Learn

The tongue has several functions. It is the speech organ since it changes the sound coming from larynx into understandable words.

Read and Learn

Mumps

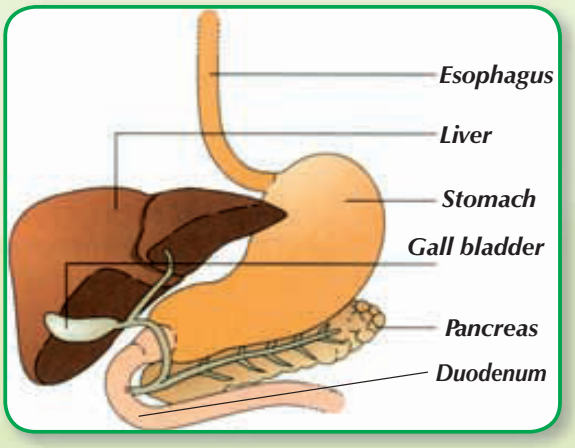
Is a viral disease infects the salivary gland which is located beneath the ear causing its inflammation.

(2) Pharynx

It is a common cavity leads to the esophagus and trachea.

(3) Esophagus

It is a muscular tube that the food travels through from your pharynx to your stomach.



(4) Stomach

A muscular sac works on mixing food up by its digestive juices. After a few hours food changes into semi - liquid substance, in where an incomplete digestion of protein takes place by a gastric juice, then food travels to the small intestine.

(5) Small intestine

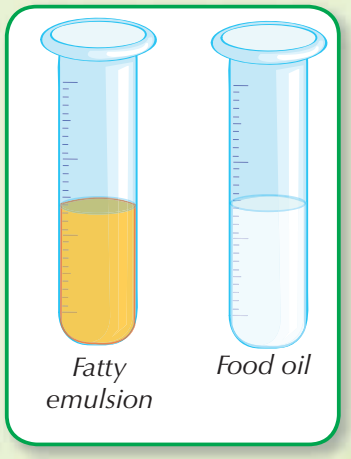
Its length is about seven meters, it coils inside the abdominal cavity. It starts with a part known as duodenum where the bile juice (secreted by liver) and pancreatic juice (produced by pancreas) are poured in. Duodenum is followed by a part of the small intestine known as ileum. Intestinal juice is poured in the ileum where the digestion to different types of food is completed.

Activity (4): Bile Juice Function

Have a test tube contains an amount of food oil then add some bird's bile juice to it. Shake it well.

What do you observe?.....

Conclusion .....



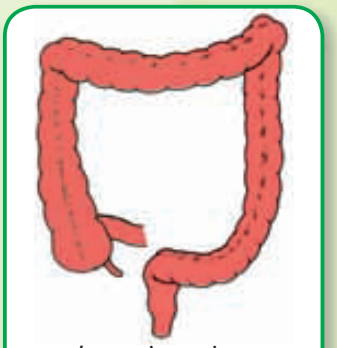
Bile juice: helps to digest fats where it changes fats into a fatty emulsion.

- **Absorption**

Digested food is absorbed through small nipples called villi that found in the small intestine walls then it reaches blood which distribute it all over the body organs.

(6) Large Intestine

It starts from the end of small intestine ending in the anus which is located at the end of the rectum. Water is absorbed in rectum from food remains, then these wastes are ejected outside the body through the anus.



Large intestine

Exercise

Work with your classmates in a team representing the digestive system organs and each classmate describes what is happening to food when passes through him.

Read and Learn

Process of digestion requires great amount of water because water helps to break down the complex food substances into simpler substances which the body gets benefited from.

Keeping The Digestive System Healthy

To keep your digestive system healthy, you have to follow the following instructions:

1- Chew the food well.

2- Don't eat much food that contains large amounts of fats such as fast meals.

3- Skip having food containing the additive compounds and flavourings.

4- Skip purchasing food from streets to avoid infectious diseases.

5- Practice sports regularly.

Read and Learn

Importance of food

1- Carbohydrates and fats supply the body with energy.

2- Proteins help body to grow and act for healing wounds.

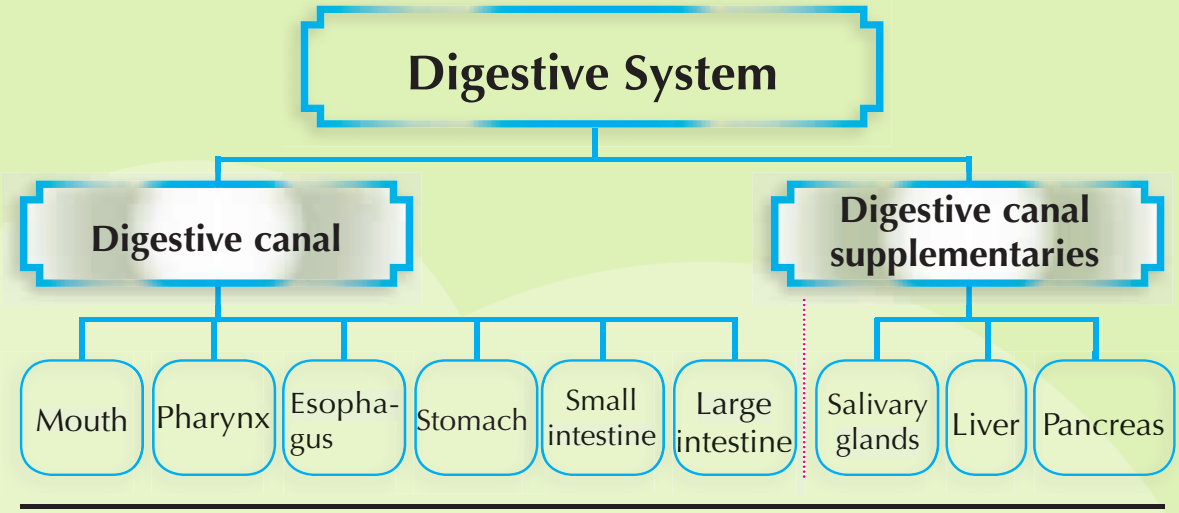
3- Vitamins protect human from getting infected by diseases.

Optional Activity

Choose one of the following activities and perform it, then add it to your portfolio.

- Shortly write about food journey inside your body.
- From the materials in your environment, design a model of the digestive system.

Summary



Exercises and Activities

Question 1: Choose the right answer

1- Digested food is absorbed in the .....

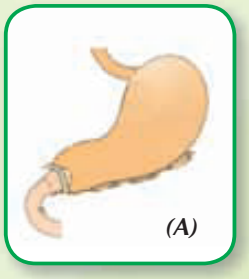
(a) esophagus (b) stomach

(c) small intestine (d) large intestine

2- Starches digestion starts by the.....

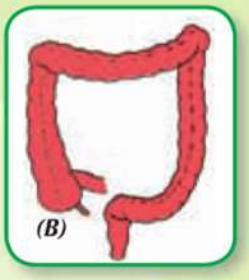
(a) gastric juice (b) intestinal juice

(c) saliva (d) bile



Question 2: Figure (A) shows a part of the digestive system known as .....

Question 3: Figure (B) shows a part of the digestive system Known as .....

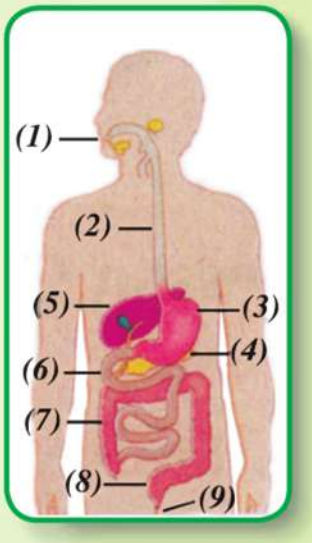


Question 4: Which of the following is a correct statement.

A- Gastric juice digests fats.

B- Saliva digests protein.

C- Bile juice helps to digest fats.



Question 5: Label the opposite figure then answer the following:

A- Name the organs where starches are digested in.

B- What is the benefit of the organ number seven?

C- What is the organ that produces a bile juice? What its number in the opposite figure is?

Question 6: Look at the figure, then complete

A- Protein digestion starts in .....

B- Starches digestion starts in .....

C- Fat digestion starts in .....

Question 7: What is the advice that you should give your classmates to keep their digestive system healthy?

Self reflection and Self evaluation

My dear student: After you have studied the digestion and the digestive system, fill in the following card and add it to your portfolio:

A- What are the parts you like in the lesson?

B- What are the parts you didn't like in the lesson?

C- What is the problem you faced during the performance of the previous activities?

D- What are the benefits you gained by studying the digestive system?

2 LESSON TWO

Human Respiratory System

Lesson Objectives

By the end of the is lesson, a student will be able to:

1. Identify what respiration means.
2. Name the respiratory system organs.
3. Draw a simplified diagram of the respiratory system.
4. Perform experiments show the respiration mechanism.
5. Indicate the relation between the human digestive and respiratory system.
6. Highlight the harms of environmental pollution and smoking on the respiratory system health.

Lesson Items.

- Structure of respiratory system.
- Function of respiratory system.

Life Issues

- Addiction: Reasons and protection.

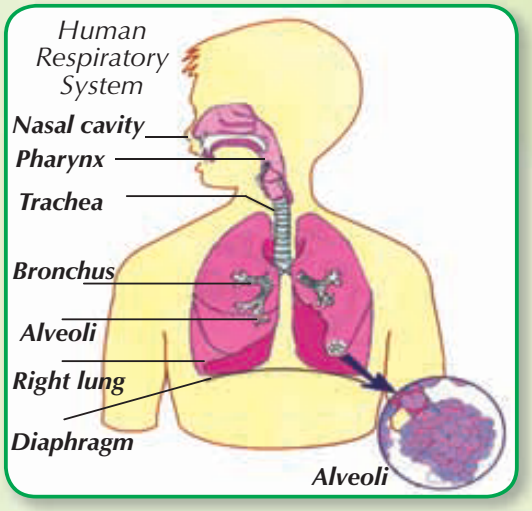
Man requires the process of respiration to get the needed energy from nutrients in order to enable the body systems doing their different functions such as transport, motion, excretion, sensation

...etc

Activity (1): Structure of Respiratory System

The opposite diagram shows the respiratory system. Identify its components then write them down according to their order in the diagram.

1. ..... 2. .....
3. ..... 4. .....
5. ..... 6. .....



Respiratory system consists of the nose, pharynx, trachea, the two bronchi and the two lungs

(1) Nose

It is lined with a mucous layer and hair to obstruct and filter dust and microbes before the entering of air into the lungs. It also contains blood capillaries (tiny blood vessels) to warm the air as it passes through.

Read and Learn

Inhaling through the mouth causes human infection with many thoracic diseases.

(2) Pharynx

A common cavity leads to the esophagus and trachea.

(3) Trachea

- Trachea is a tube supported with incomplete cartilaginous rings that make it permanently open and it is also lined with cilia to eject up the strange objects.
- At the top of trachea there are the larynx (voice box) and epiglottis which closes off the opening of trachea during swallowing, this forbids food from entering the trachea.
- The bottom of the trachea branches into two narrow tubes called bronchi which enter the lungs.

(4) Lungs

Bronchus is divided into bronchioles inside each lung ending in alveoli which is surrounded by a network of blood capillaries in where gas exchange occurs.

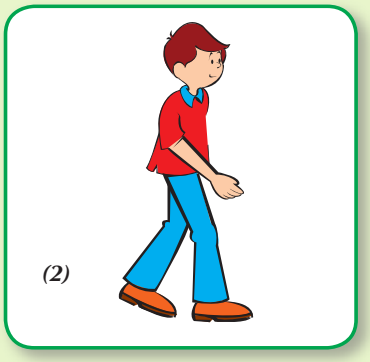
The two lungs occupy the thoracic cavity and they are anteriorly surrounded by the ribs. Diaphragm separates the thoracic cavity from the abdominal cavity.

Read and Learn

We inhale the atmospheric oxygen by the two lungs, whereas the fish inhales the dissolved oxygen in water by gills.

Activity (2): Respiration

Find how many times of respiration of your classmate during a minute (use a stop watch) in each of the following cases:



1- While sitting.
2- While walking.
3- During running.

Record how many times he respires per a minute in each case in the opposite table.

Position of the body	Times of respiration per minute
- **Sitting** - **During walking** - **During running**	

- Describe the motion of your classmate's chest during respiration in each case.....

Conclusion .....

Respiration: is the process carried out by human in order to get energy from burning of the digested food.

- The more active your body is, the more your respiration times increases.

Activity (3): Mechanism of Respiration

Try to perform the following experiment with a classmate in order to understand the mechanism of respiration.

■ **Materials:** a plastic bottle - two balloons - scissors - an adhesive tape - a rubber membrane.

- Cooperate with your classmate to design a model represents the two lungs as shown in the figure.
- Pull the rubber membrane which represents the diaphragm down.
  What do you observe? .....
- Release the rubber membrane to turn back to its original position.
  What do you observe? .....
- Let your classmate repeats the same previous steps.

Conclusion .....

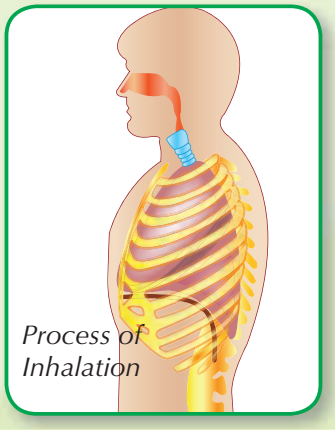
Inhalation

Exhalation

The air enters to the two balloons when pulling the rubber membrane down and the air exits when releasing the membrane up, interpret the inhalation and exhalation processes in a human being.

Process of inhalation

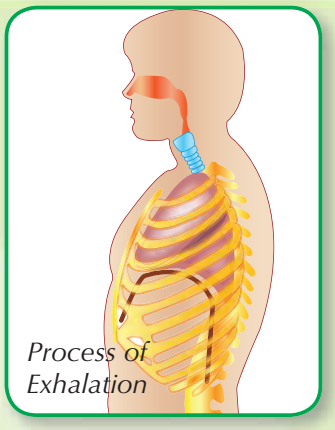
- The diaphragm muscle contracts and moves down and the thoracic cavity enlarges.
- The air rich in oxygen enters the two lungs through the nasal passage



Process of Inhalation

Process of exhalation

- The diaphragm muscle relaxes and moves up and the thoracic cavity becomes narrow.
- The air rich in carbon dioxide moves outside the lungs through the nasal passage.



Process of Exhalation

Exchange of gases

Exchange of gases occurs between the air existed in alveoli and the blood flows in the capillaries via their thin walls where blood leaves carbon dioxide and carries the oxygen and distributes it all over the body cells.

Read and Learn

Lungs are out of muscles, so they can't shrink or relax alone, but this shrinking and spreading out are done through muscles located between the ribs of thoracic cavity and the diaphragm muscle.

Components of exhaled air

Activity (4): Detecting carbon dioxide in exhaled air

- **Materials:** A test tube - clear lime water- a thin tube

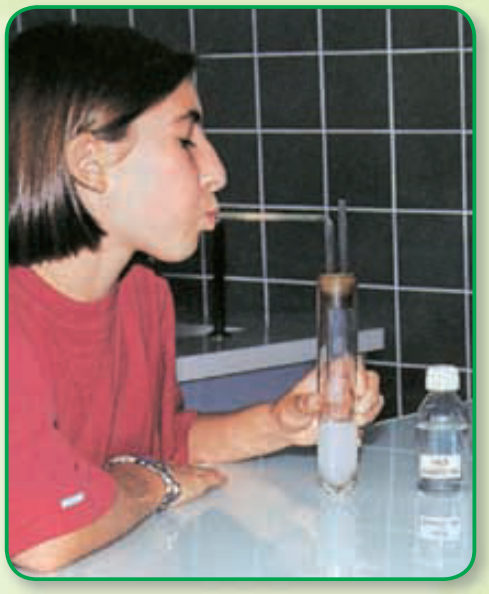
Procedures

- Blow the air gently through the tube in the cup which contains clear lime water.
- Continue in blowing air for two minutes.

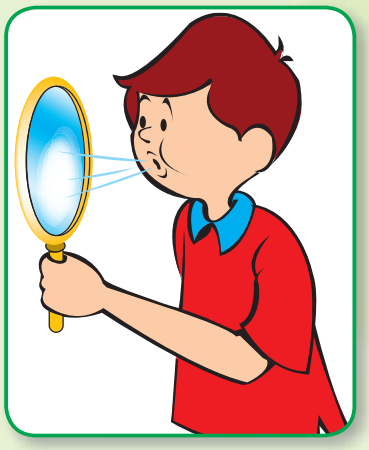
What do you observe? .....

Conclusion .....

The turbidity of lime water is an evidence for the presence of carbon dioxide in the exhalation air.



Activity (5): Detecting for water vapour in the exhaled air



Bring a mirror or a glass sheet and place it in front of your mouth then exhale on its surface.

What do you observe? .....

Conclusion .....

Water droplets are formed on the glass sheet and this is an evidence for the presence of water vapour in the exhalation air.

Exhalation air contains carbon dioxide and water vapour as products of respiration process.

Keeping the respiratory system healthy

To Keep your respiratory system healthy you should stick to the following:

1- Skip being in crowded or poor ventilation places.
2- Keeping off the severe cold.
3- Eating fruits rich in vitamin (c) such as oranges, guava to protect yourself from cold.
4- Stop smoking or being a passive smoker, because it leads to cancer causig death.

Optional Activites

Choose one activity from the following ones carry it out, then add it to your portfolio:

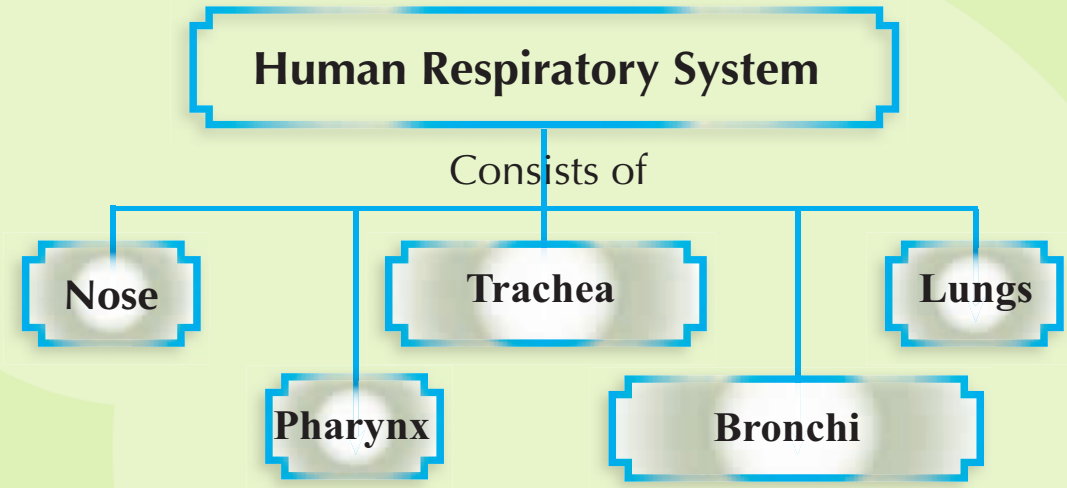
1- Write a short brief about the air journey till the entrance to the lungs and alveoli.

2- Design a model for the respiratory system using materials from your environment.

3- Smoking is considered a reason of why the respiratory system gets infected by cancer.

How can you advise one of your smoking relatives to stop smoking?

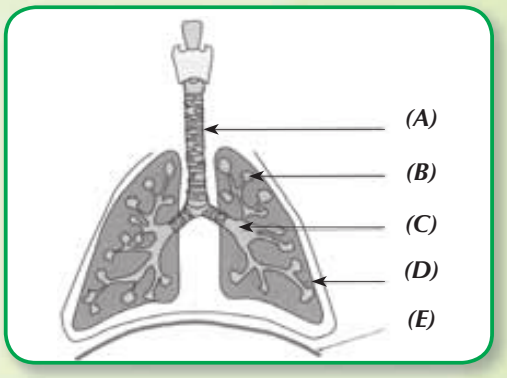
Summary



- **Respiration:** is the process by which human can get energy from burning of the digested food .
- Exhalation air contains carbon dioxide and water vapour.

Exercises and Activities

Question 1: The opposite diagram shows the respiratory system in a human being. Use the words below to complete the table:



Alveoli - Bronchus - Diaphragm- Trachea - Lung

Letter	Organ's name	Function
A		
B		
C		
D		
E		

Question 2: Complete the following sentences.

1- .....muscle helps the mechanism of respiration.

2- Exchange of gases occurs in lungs between .....and .....

3- Air enters into the lungs during the process of .....and leaves them during the process of .....

Question 3: Why is exhalation air considered different from inhalation air? Give an experimental evidence.

Question 4: Breathing through the nose is preferable than breathing through the mouth. Explain

Question 5: Protecting the environment against pollution is an important factor for keeping respiratory system safe. If you face a pollution problem in your environment, how can you solve it?

- Problem: .....
- Your suggestions to solve it: .....
- Ideal solution: .....

Self reflection and Self evaluation

My dear student, after you have learnt respiration and the respiratory system, fill the next card and add it to your portfolio.

(a) What are the parts you like in the lesson?

.....

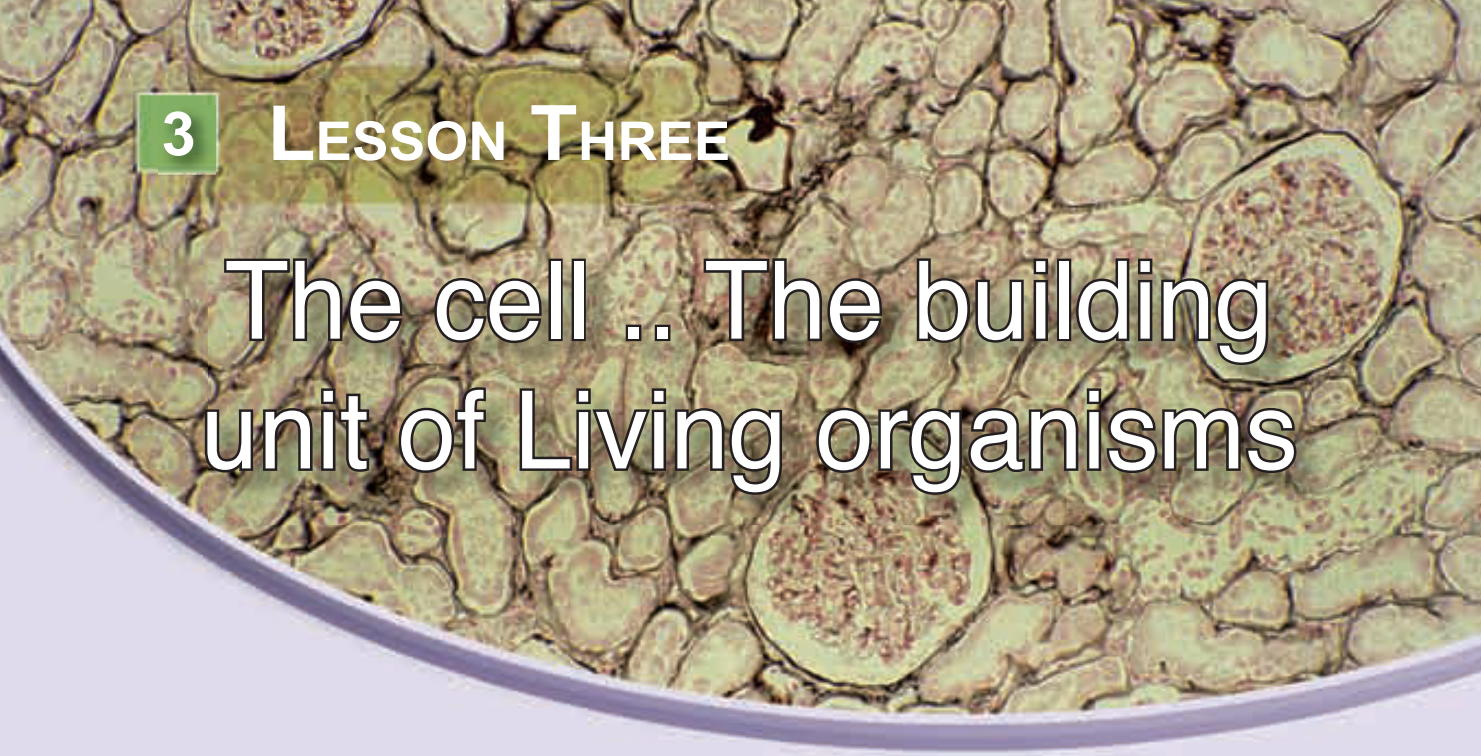
(b) What are the parts you didn't like in the lesson?

.....

(c) How much is your overlapping with your classmates in carrying out the activities included in the lesson?

.....

.....



3 LESSON THREE

The cell .. The building unit of Living organisms

Lesson Objectives

By the end of this lesson, a student will be able to:

1. Recognize the levels of organization in living organisms.
2. Infer that the cell is the building unit of living organisms.
3. Use the microscope to examine a plant and an animal cell.
4. Compare between the plant cell and the animal one.
5. Examine the yeast fungus.
6. Show the importance of the yeast fungus.

Lesson Items.

- Levels of organization in a living organisms.
- The plant and animal cells.
- The yeast fungus.

life Issues

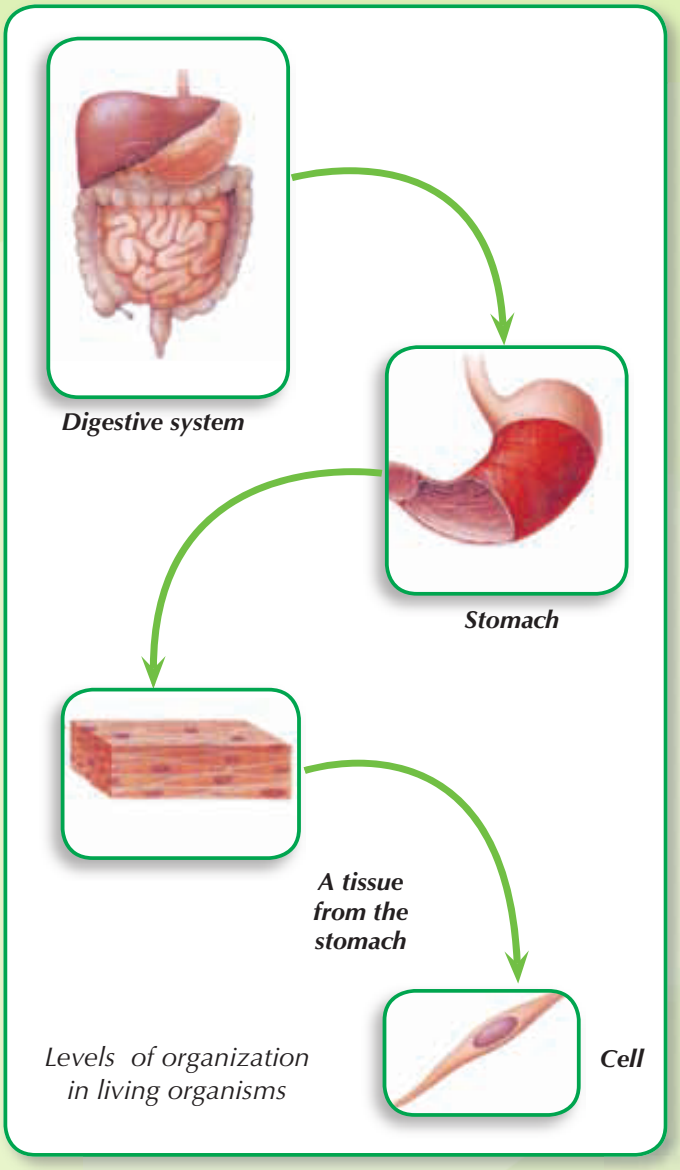
- Resources best use, and development.

Previously you have known that the body of a living organism consists of a group of systems working integrally together to keep life on, and you have also learnt that both digestive and respiratory systems consists of a set of organs.

What is an organ made up of ?

An organ consists of similar or different tissues, and each tissue is made up of a symmetric set of cells. Plants are also made up of organs such as roots, stems and leaves, each organ is made up of tissues and every tissue is made up of symmetric units known as cells.

Animal cell is the building unit of an animal body and the plant cell is the building unit of a plant.



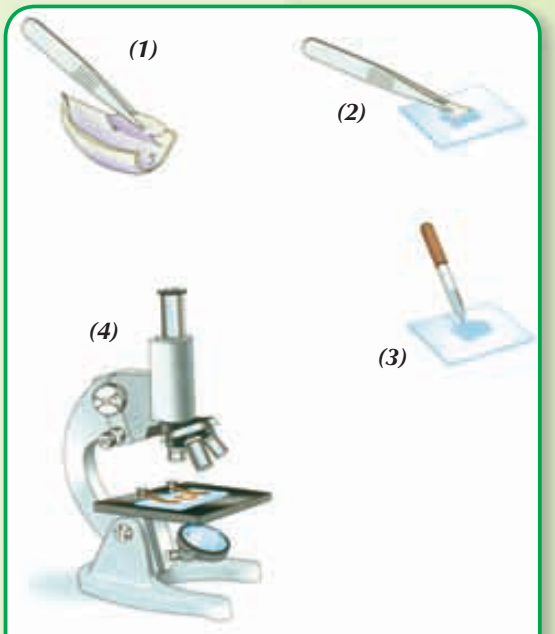
Levels of organization in living organisms

Activity (1): Plant cells examination

■ **Materials**: an onion plant - forceps - a magnifying lens - microscope - a glass slide

■ **Procedures**

- Remove an internal leaf from the onion plant and try to remove the transparent epidermis from a part of this leaf using the forceps.
- Use the magnifying lens to examine the onion leaf epidermis.
- Describe what do you observe. .....



Steps of a plant cell examination

- Know how to use the microscope from your teacher.
- Put the onion leaf epidermis on the glass slide and add a drop of water on it.
- Check the slide by using the microscope.
- What do you observe? .....

Conclusion: .....

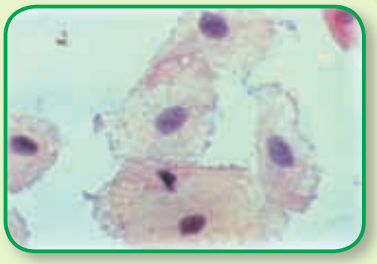
Plant cell

Plant tissue

The epidermis tissue of the onion plant leaf consists of similar units known as the plant cells.

Activity (2): Animal cells examination

- **Materials:** A mouth lining membrane ready made slide.



Mouth lining tissue

- **Procedures**

- Check the slide by using the microscope.

  What do you observe? .....

  Conclusion: .....

- The mouth lining membrane is made up of similar units known as animal cells.

The cell is the building unit of the living organism's body.

The cell simplified structure

All cells are units contain:

1- Nucleus: organizes the biological operations inside the cell and it is responsible for cell division.

2- Cytoplasm: Fill the space and biological operation are acted by it.

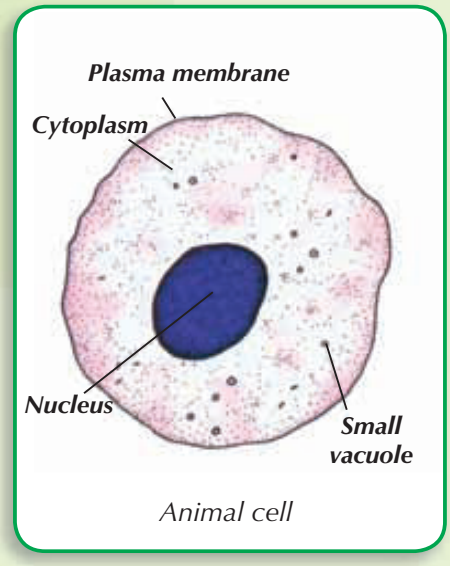
3- Plasma Membrane: surrounds the cell and controls the substances entering into the cell or leaving it.

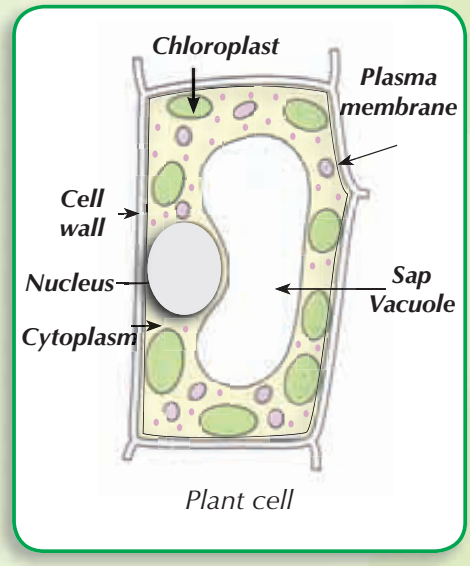
Read and Learn

Cells are units that differ in shape and size according to their locations and functions. The tissue cells are similar in shape and functions, but, they differ from other cells. For example, stem cells in plants differ from the leaf cell and your skin cells differ from your muscular cells, as well as the cells of plants differ from cells of animals.

Activity (3): Comparing between a plant cell and an animal one

- Recognize the contents of both the plant and animal cells in the next diagram then conclude the difference.





- Put (✔) in front of the part which is existed in the animal or the plant cell in the next table:

Cell parts	Plant cell	Animal cell
1- Cell wall		
2- Plasma membrane		
3- Nucleus		
4- Cytoplasm		
5- Chloroplasts		

Read and Learn

On examination the animal and the plant cell by using the compound microscope we can't see all the internal components of the cell since they are very tiny, but after discovering of the electronic microscope scientists become able to see all the cell components.

The plant cell, than the animal one, is characterized by the presence of a cell wall surrounding it and contains chloroplasts which are responsible for making food in a process known as photosynthesis.

Unicellular organisms

There are a lot of unicellular micro- organisms around us which can't be seen by the naked eye such as bacteria and yeast Fungus.

Yeast fungus

The unicellular organism is considered as an integrated living organism has the ability to do all the biological functions and it is a model to the cell ability as a unit of structure and function of a living organism body.

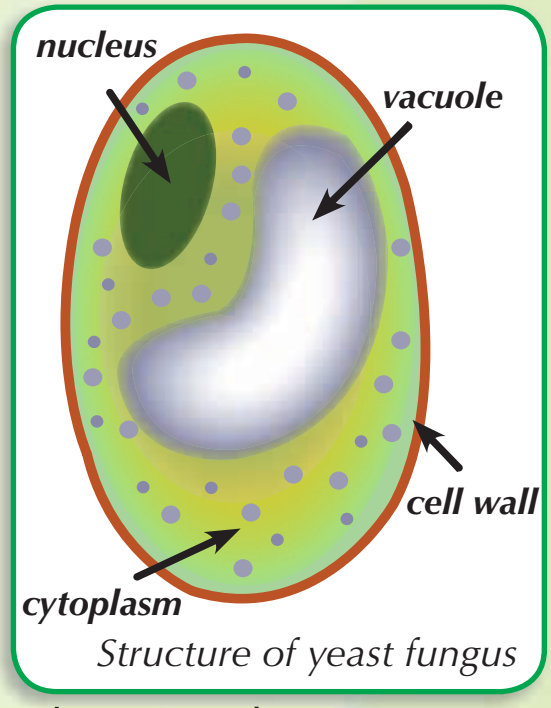
Activity (4): Yeast fungus Examination

- **Materials:** A prepared slide of yeast fungus, Microscope.
- Use the compound microscope to examine the prepared slide of yeast fungus then describe what you see .....
.....

Read an Learn

Some unicellular organisms are harmful such as bacteria that causing a lot of diseases, and others are useful such as the bacteria used in making yoghurt and some types of cheese ,as well as the yeast fungus used in making bread.

Structure of yeast fungus: It is an unicellular living organism that made up of nucleus, cytoplasm and a Cell wall that determines the cell's shape. The fungus has a great economic value.



Structure of yeast fungus

Economic importance of the yeast fungus

Yeast fungus is used in a lot of industries such as:

1- Making bread **2-** Making alcohol

Optional Activites

Choose an activity of the following and carry it out, then add it to your portfolio.

1- Collect photos to different shapes of plant and animal cells, then write a short brief beside each photo expressing the place and the function of the cells.

2- Unicellular organisms have several uses. Write a short brief expressing their most useful life applications.

Summary

Cell is the unit of structure in a living organism.

Cells → Tissues → Organs → Systems

Yeast fungus is an unicellular living organism which is used in a lot of industries such as :

A. Making bread B .Making alcohol

Exercises and Activities

Question 1: **Choose the correct answer:**

1- Which of the following can be existed in a plant cell and can't be existed in an animal cell? .....

(a) Nucleus (b) Chloroplast

(c) Cytoplasm (d) plasma membrane

2- The ..... is an example of unicellular living organisms.

(a) frog (b) snake

(c) yeast fungus (d) a bean plant

3- All the following can be found in yeast fungus except .....

(a) cytoplasm (b) nucleus

(c) chloroplast (d) cell wall

Question 2: Relate the following organs to the human body different systems (stomach- trachea)

Question 3: Compare the structure of the plant cell, animal cell and yeast fungus in the opposite table.

Comparison	Plant cell	animal cell	yeast fungus
Nucleus			
Cytoplasm			
Chloroplast			

Question 4: Give an example to each of the following:

A- A unicellular living organism.

B- An organ related to the digestive system in the human body.

C- A tissue in a plant.

D- A system carries out the transport function in the human being.

Question 5: Have a bottle containing a diluted solution of cane honey and add a piece of yeast to it , then place a balloon on the glass mouth. Let it in a warm place for few hours ..... Record your observations.

Self reflection and Self evaluation

My dear student, you can fill in the following card and add it to your portfolio:

A- What are the items you like in this lesson?

.....

B- What are the items you dislike in this lesson?

.....

C- What are the activities you did and helped you to understand the lesson?.....

D- What is the activity you found it difficult to carry it out?

.....

E- What is the importance of your overlapping with your classmates during the performance activities?

.....

4 LESSON FOUR

The importance of sunlight to living organisms

Lesson Objectives

By the end of this lesson, a student will be able to:

1. Identify the importance of sunlight as an energy resource for plants.
2. Explain what photosynthesis is.
3. Show experimentally the effect of sunlight absence on the green plants.
4. Show experimentally the photosynthesis products.
5. Identify what a producer living thing is.
6. Give examples of the producers.
7. Give examples of the consumers.
8. Identify the bacteria and fungi which feed on the organic wastes.
9. Show the importance of decomposers in nature.
10. Compare the producers, consumers and decomposers.
11. Invite his classmates for protecting the green plants and trees in their environment.

Lesson Items

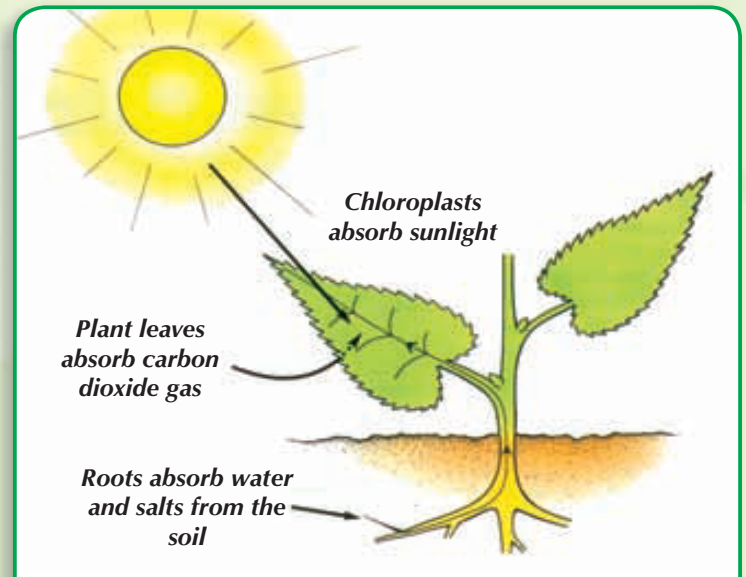
- Sun is the energy resource for plants.
- Producers, consumers and decomposers.

Life Issues

- Pollution control.

A lot of animals depend mainly on plants to get their food. Plants supply animals with the required energy for survival. For example, we see cows and sheep feed on the plants, and birds feed on the seeds of some plants. How do plants manufacture their food?

Plants manufacture their food



The process of photosynthesis in green plants

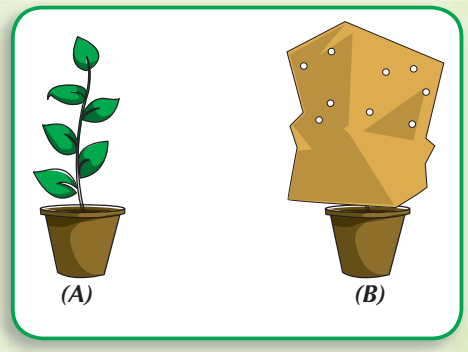
Plant cells contain chloroplasts which give the plants the green colour and absorb sunlight as well.

Plants absorb the light energy of the sun, water and salts from the soil, and carbon dioxide from the air in order to form their food, This process is known as photosynthesis.

Activity (1): Importance of sunlight for green plants

Have two flowerpots, each one contains a green plant. Cover one of them by a constructed paper sack with narrow holes to let air goes through.

Leave the two flowerpots for two days and keep watering them regularly.



What happened to both pots after two days?

Record your observations.....

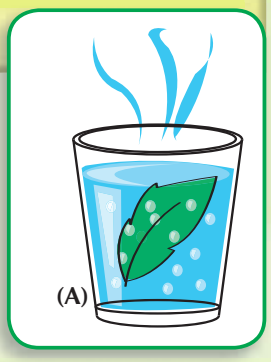
Conclusion .....

The covered plant becomes yellowish and weak, this is related to the absence of sunlight and the plant stopped manufacturing its food.

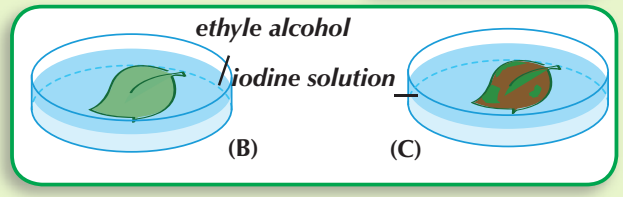
Sunlight (light energy) is necessary for plants to make their own food . Furthermore, sunlight is considered as the resource of energy for plants.

Products of photosynthesis

Activity (2): Check the existence of starch in the green plant leaves



- Remove a green plant leaf from a potted plant after being exposed to the sun for several hours.
- Put the leaf in a cup containing boiled water for thirty seconds then put it in ethyl alcohol to get rid of the leaf green colour and finally wash the leaf with water and put it in an iodine solution to check if it contains starch.



What do you observe? .....

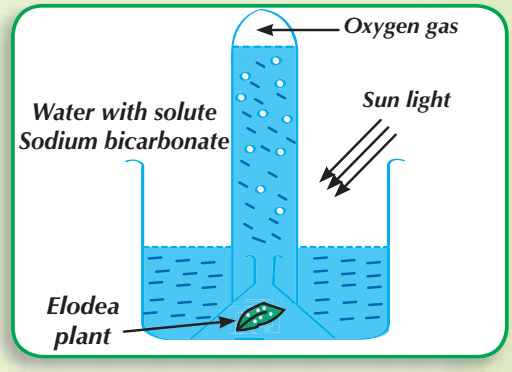
Conclusion .....

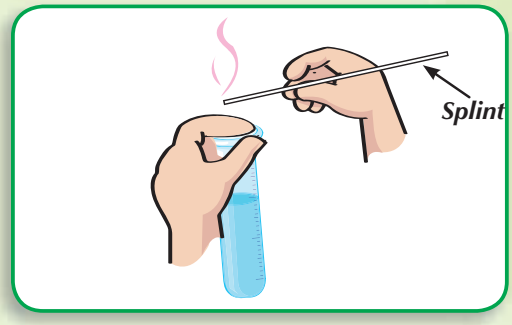
Read and Learn

Starch is the stored form of carbohydrates in plants and you can check its existence by using iodine.

Plants make their food (starch-sugar) through the process of photosynthesis in the existence of sunlight, water, and carbon dioxide gas.

Activity (3): Releasing Oxygen Examination





- Bring a water tank containing water with sodium bicarbonate dissolved in it as a source of carbon dioxide gas. Put an aquatic plant such as Elodea under a glass funnel and place a test tube filled with the tank water above this funnel.
- Expose the apparatus to sunlight for few hours.
- Compare the water level in the tube before and after the experiment performance.
- Block the tube mouth with your finger from the down and then take it from the tank.
- Light a splint and bring it closer to the tube mouth.

What do you observe?.....

Conclusion .....

Oxygen is released during the process of photosynthesis

Photosynthesis Process: A biological process takes place in the plant green parts to make a food of sugars and starches in the existence of sunlight, water, carbon dioxide and some mineral salts and oxygen is released .

Producers: are the living organisms that can make their own food by themselves through the process of photosynthesis

Examples of producers:

- Green plants - algae - types of bacteria

Exercise

Plants are known as amyotrophic living organisms- Explain this sentence.

.....

.....

Read and Learn

Green plants use carbon dioxide in the process of photosynthesis and release oxygen where-as they take oxygen in and release carbon dioxide out in the process of respiration

Consumers :

Consumers are the living organisms depending on producers to get their own food directly or indirectly.

Examples of consumers:

- Cows, sheep and chicken ... feed on producers (green plants).
- Lion, snake, hawk.... feed on consumers that previously fed on producers.

Decomposers :

Activity (4): Decomposing Fungi

- Put some pieces of soft bread in a plastic sack and block the sack well and leave it for a few days.
- What do you observe? .....
- Let an orange , tomato or yoghurt out of refrigerator for few days

  What do you observe? .....

  Conclusion .....

The rot formed on the bread and the orange is a living organism called fungi which known as the decomposers.

Attention

Don't touch the decayed food with your hand, put on gloves before you touch it.

Attention

When you buy a reserved food, be sure of the validity date stated on the cover.

Decomposers

Are living organisms can't make their own food by themselves since chloroplasts are not existed in their cells. Decomposers get their food through decomposing the organic wastes such as dead bodies, plant remains and decayed food.

Examples of decomposers:

1- Some types of bacteria.

2- Some fungi such as bread mould fungus.

Importance of decomposers:

1- Help us get rid of the organisms dead bodies and the plant remains.

2- Increase the soil fertility.

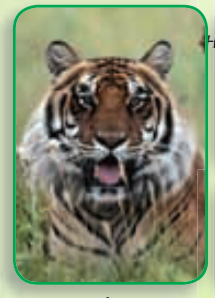
3- Used in a lot of industries.

Read and Learn

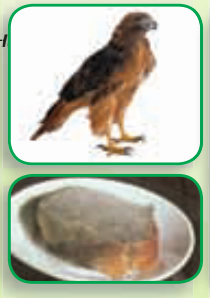
A lot of industries depend mainly on decomposers such as production of organic fertilizers, biogas and tanning leathers and others.

Exercise

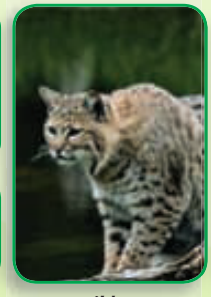
Classify the following living organisms according to the way of their feeding



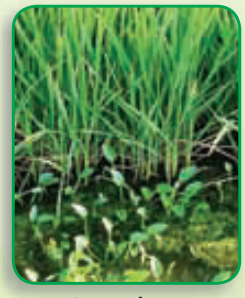
Tiger



Bread mold fungus



Wild cat



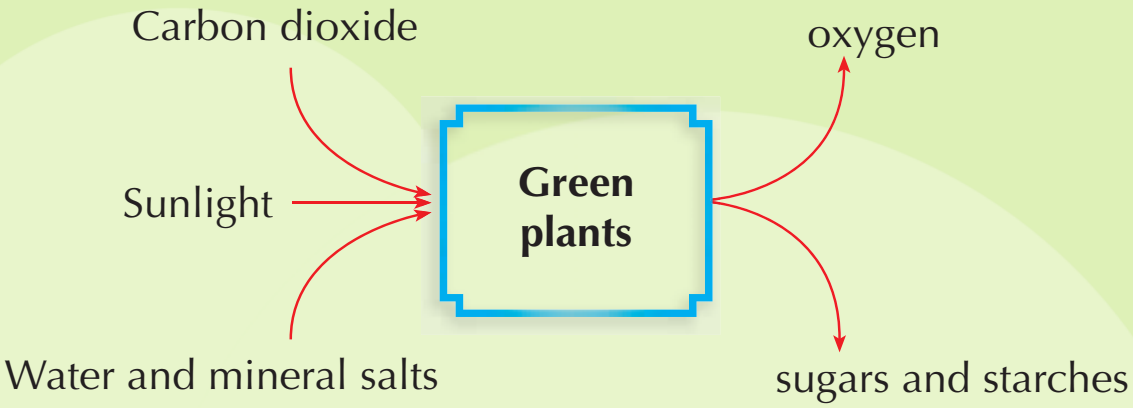
Green plant

Optional Activites

Choose an activity of the following and carry it out , then add it to your portfolio:

- Write a paragraph on the role of some bacteria and fungi in nature.
- Collect photos to producers , consumers and decomposers.

Summary



Types of living organisms according to their feeding

Producers	Consumers	Decomposers
- Green plants	- Animals	- Some fungi
- Algae	- Human	- Some bacteria

Exercises and Activities

***Question 1:* Choose the correct answer**

1- ..... are examples of producers.

(a) Algae (b) reptiles

(c) Fungi (d) Birds

2- ..... are examples of decomposers .

(a) Algae (b) Reptiles

(c) Fungi (d) Birds

3- A hawk is an example of .....

(a) producers (b) consumers

(c) decomposers (d) all the previous

4- Chloroplasts are found in .....

(a) producers (b) consumers

(c) decomposers (d) all the previous

5- Bread mould fungus is a.....

(a) producer (b) consumer

(c) decomposer (d) all the previous

***Question 2:* Complete the following sentences.**

1- ..... gas is produced by green plants during the process of photosynthesis.

2- To check the existence of starch in the plant leaf by using ..... .

3- the process of photosynthesis needs the presence of ..... , ... , ...

***Question 3:* Classify the following living organisms into producers, consumers and decomposers:**

dog - lion - corn plant - green alga- yeast fungus - human- yoghurt bacteria

***Question 4:* Give reasons**

1- Decomposers have a great economical and environmental importance.

2- There are chloroplasts in the cells of the producers.

***Question 5:* Compare between producers, consumers and decomposers, then give an example for each type.**

Self reflection and Self evaluation

After you have learnt the sunlight and living organisms, try to fill in the following card, then add it to your portfolio

A- What are the items you got like in this lesson?

.....

B- What are the items you dislike in this lesson?

.....

C- What is the activity that attracts your attention and got pleased with it?

.....

D- State the difficulties you faced when performing the activities of this lesson and how you overcome them.

.....

5 LESSON FIVE

Energy paths through living organisms

Lesson Objectives

By the end of this lesson, a student will be able to:

1. Identify food chains.
2. Form food chains through different environments.
3. Interpret that the food chain is a model shows the flow of energy from an organism to another.
4. Identify food webs.
5. Show the relation among food chains and food webs.
6. Follow the energy paths from an organism to another in food webs.

Lesson Items

- Food chains
- Food webs

Life Issues

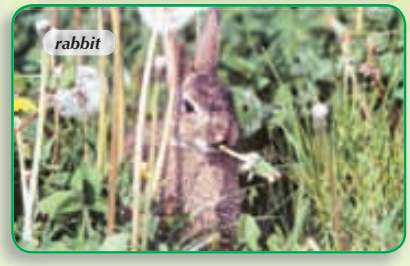
- Environmental protection and development.

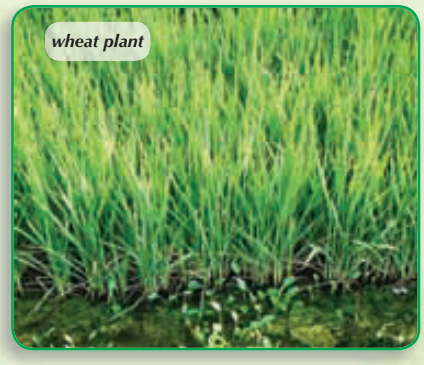
All living organisms need food as a source of energy. Plants produce food and animals depend on these plants or other animals to get food. Some bacteria and fungi get their food through decomposing plants and animals after their death and so they help the environment to get rid of the remains of those organisms.

Therefore there is a relation connecting these living organisms together.

Food Chains

Activity (1): Food relations





Check the photos of the following living organisms:

- What do you observe?
- Classify these living organisms according to their food relations with each other into:

- Producers .....
- Consumers .....
- Decomposers .....

- Conclusion: .....
  .....

Activity (2): Forming food chains

Materials:

Four cards of coloured paper - coloured pencils - adhesive tape- scissors - photos of living organisms (hawk- plant- snake - rabbit)

Snake

Hawk

Rabbit

Plant

Procedures

Cut the photos and paste them on the four cards.

- Order the cards in a form shows how each of them depends on the other for getting its food.
- Determine the producers, consumers and decomposers, then write what you conclude at the lower end of each card.
- Discuss your classmate how each living organism gets its food.
- what is your Explanation? .....
  .....
- Conclusion .....
  .....
- The ordered cards are representing a model of a food chain.

Food chain is a path that the energy transmits in a form of food from a living organism to another one.

Food chain begins with a producer then herbivore consumers then carnivore consumers then these organisms died and decomposed by another organisms (Decomposers). So the cycle is repeated and the life is continuous

Exercise

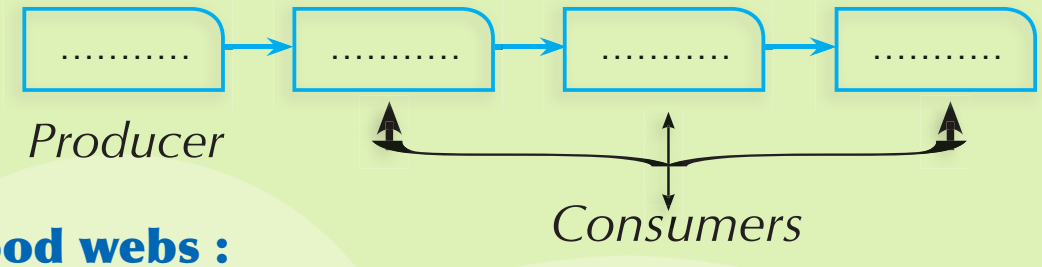
Form another model of a food chain for living organisms live in water containing of a big fish-algae-small fish - and quatic insects.

Shark

Fish

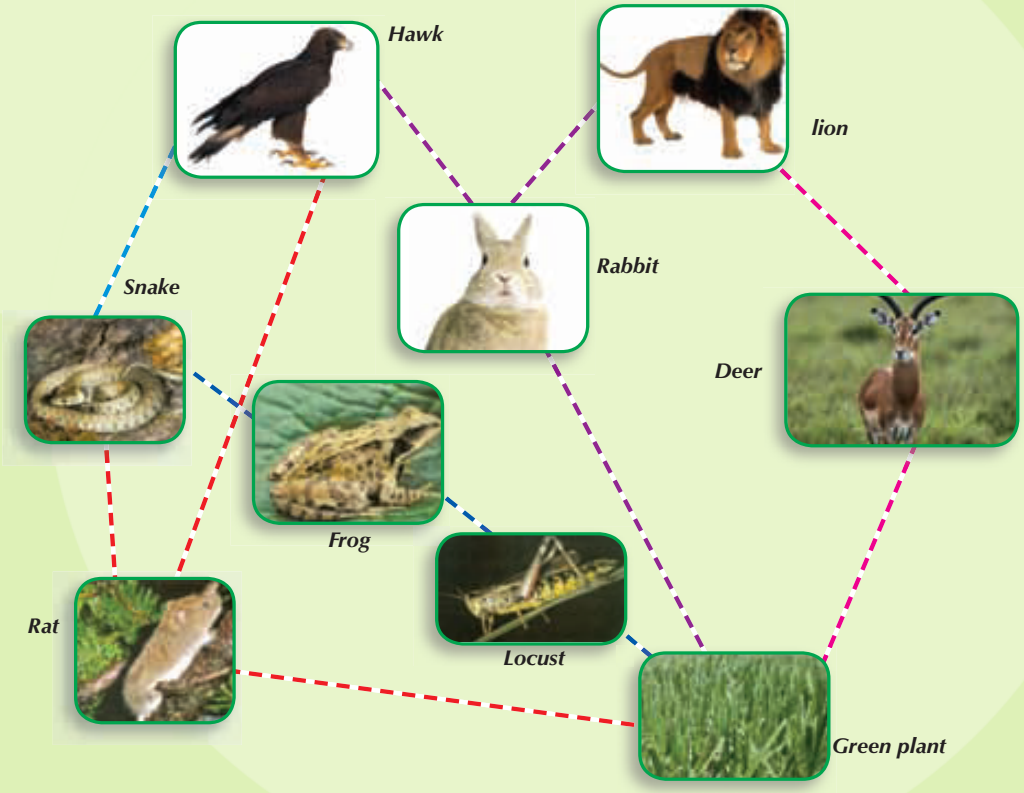
aquatic plants

Water beetle



Food webs :

When a group of food chains connect with each other, these food chains form a food web.



Activity (3): Look at the previous graph and identify the following

1- Three different food chains.

- .....
- .....
- .....

2- The living organism which all food chains start with.

- .....

Food web is a group of overlapping food chains representing the flow of energy through living organisms in the form of food.

The importance of solar energy for consumers and decomposers

- Producers such as green plants make their own food using the sunlight energy and store it in the form of chemical energy .
- When consumers such as locusts or rabbits feed on these plants, the stored energy in these plants (in the form of food) transfers into consumers.
- By the death of consumers, the energy transfers into the nature through decomposers.

Energy paths through living organisms

Activity (4): Tracking the energy paths through living organisms

- Use the shown photos of the living organisms to form a food chain.

..... → ..... → ..... → ..... → .....

1 2 3 4 5

- Tracking the energy path in this chain.

.....

Energy is transmitted in the form of food from a living organism to another. Energy passes through certain paths among living organisms in the food web.

Exercise

Form food chains using the following table. Use different colours, then observe the overlapping lines with each other.

Read and Learn

Energy decreases gradually when it transferred from a living organism to another. The highest amount of energy in producers (green plants). And the least amount of energy in last consumers since every living organism consumes an amount of energy to practice its vital activities.

Hawk	**Rabbit**	**Grass**
Snake	**Earth warms**	**Field cockroach**
Rat	**Owl**	**Frog**

Optional Activites

- Form a food chain using some photos of living organisms inhabit in different environments.
- Work with your classmates for representing a food web where every classmate puts a sign on his chest pointing to the name of a living organism such as turtle- owl-hawk-snake-plant and so on.

  Show which feed on other.

Summary

- **Food chain:** is the energy path in a form of food from a living organism known as a producer to another living organisms known as consumers.
- **Food web:** is a group of food chains representing the flow of energy through living organisms in the form of food.
- **Energy paths:** are paths that show the energy transference in the form of food from a living organism into another within the food web.

Exercises and Activities

***Question 1:* Complete the following sentences:**

1- ..... feed on the organic remains .

2- ..... is known as the energy transference from a living organism to another .

3- The living organism which makes its own food is known as .....

4- The producer gets the energy from .....

Question 2: Form a food chain from a desert environment and another one from an aquatic environment.

***Question 3:* Give reasons:**

1- All food chains begin with producers.

2- Green algae are considered as producers.

Question 4: Answer the following questions using the following photos.

1- What are producers and consumers?

2- Form a food chain.

3- Show energy paths among the living organisms of this chain.

4- What is the expected end to the living organisms enclosed in this chain?

Question 5: **Form a food chain ending by you.**

Self reflection and Self evaluation

By the end of studying the energy paths through living things, fill in the following card and enclose it to your portfolio.

A- What are the items you like in this lesson?

.....

B- What are the items you dislike in this lesson?

.....

C- Are you able to form a food chain?

.....

D- Try to place yourself within a food chain, what are the other living organisms included in your chain?

.....

General Exercises on Unit (1)

***Question 1:* Complete the following sentences :**

1- ..... gas is evolved during the process of photosynthesis while ..... gas is released as a product of a respiration process.

2- The living organism body is made up of systems integrated with each other, and every system is made up of ..... containing ..... each of them has its own function.

3- Proteins are digested in ..... and .....

4- The living organisms which are responsible for decomposing remains of living organisms are known as .....

5- When food chains connect with each other, they form .....

6- ..... and ..... are examples of digestive juices in the human body.

7- Food chains begin with ..... such as .....

8- ..... is an example of the unicellular living organisms.

9- In green plants, ... energy is changed into ..... energy stored in a form of food .

10- Human being is considered as ..... in the food chain.

***Question 2:* Choose the correct answer:**

1- Gas exchange during the process of respiration occurs in the .....

(a) trachea (b) nose

(c) mouth (d) alveoli

2- Plants use ..... in the process of photosynthesis.

(a) oxygen (b) nitrogen

(c) carbon dioxide (d) water vapour

3- A food chain starts with the .....

(a) consumers (b) plants

(c) decomposers (d) animals

4- Undigested food is assembled in the .....

(a) stomach (b) small intestine

(c) large intestine (d) duodenum

5- The ..... is an organ of the human respiratory system.

(a) heart (b) stomach

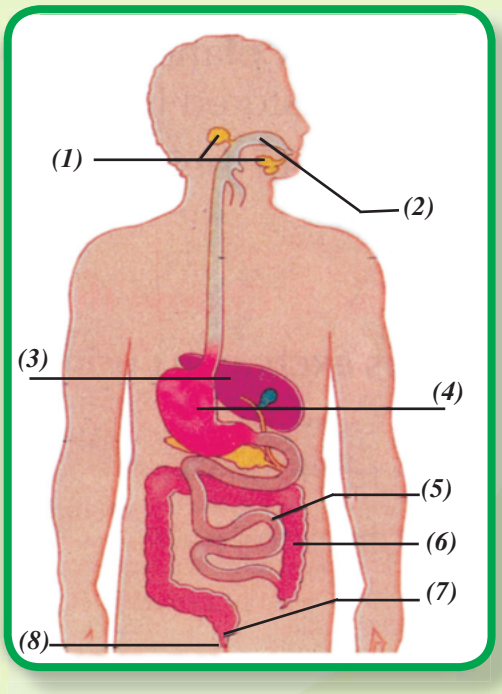
(c) lungs (d) liver

6- The stomach belongs to the ..... system.

(a) digestive (b) reproductive

(c) urinary (d) nervous

***Question 3:* Answer the following questions depending on the following figure.**



1- At which part saliva is secreted?

2- What is the relation between the organ number (3) and digesting fats?

3- State the number of the organ which absorbs the digested food. Write its name.

Question 4: The opposite experiment represents the process of respiration. Explain the respiration mechanism through your performance to this experiment.

Question 5: **Compare the plant cell to the animal cell regarding:**

1- Chloroplasts

2- Cell wall

Question 6: Form a food chain begins with a green plant and ends in a lion.

Question 7: State the type of juices secreted by the following glands (salivary glands – liver)

Question 8: **Write the scientific term for each of the following sentences.**

1- The building unit in a living organism.

2- A liquid secreted in the mouth and helps in starches digestion.

3- A juice is secreted from the liver and affects fats digestion.

4- Small organelles spread in the cytoplasm of the plant cells and make photosynthesis process.

5- The living organisms that can make their own food by themselves through the process of photosynthesis.

6- The path of energy transference in the form of food from a living organism to other living organisms.

7- A group of food chains represent the flow of energy through living organisms.

Question 9: **What happens in each of the following cases:**

1- The absence of chloroplasts from the corn plant cells.

2- The absence of decomposers from nature.

3- Removing the small intestine from a human body.

4- Removing the epiglottis from a human body.

5- There were no any mucous or hair in the nose.

Unit Two

Force and Energy

- Energy and its effect
- Energy and its forms

Unit Lessons

1- Force and its effect
2- Forms of Energy and their Changes
3- Sources of Energy
4- The Electricity.

The force and energy around us in all times and places

Objectives

By the end of this unit, a student will be able to:

1. Explain the meaning of force and energy.
2. Conclude the relation between force and motion
3. Show that the sun is the main source of energy on the surface of earth.
4. Perform out simple experiments about force, energy, sound and electricity.
5. Give examples to show the role of science and technology in raising heavy objects.
6. Give examples to show home Equipments that depend on force and energy in their work.
7. Share his (her) classmates in designing activities and games showing force and energy.
8. Conclude information from graphical relations of force and energy.
9. Show examples of machines that depend on the sources of non-renewable energy.
10. Determine the benefits of machines.
11. Determine the benefits of solar energy.
12. Describe some phenomena related with electricity.
13. Recognize the contribution of scientists in field of force and energy .
14. Ask his (her) classmates for thinking in the effect of forces and energy in his (her) environment.

1 LESSON ONE

Force and its effect

Lesson Objectives

By the end of the lesson, a student will be able to:

1. Identify the concept of force and its effect.
2. Show by an experiment the effect of force on the motion of stationary or moving object.
3. Perform activities depend on the effect of force.
4. Design games showing the effect of force on motion of objects.
5. Show the role of science and technology in motion of heavy objects and their rising up.
6. Give examples for applications of technology depend on force and motion .
7. Identify the contribution of scientists in field of force and motion.
8. Suggest ways for the best using of force in our daily life.

Lesson Items

- Meaning of force
- Force and motion
- Technological application

Life Issues

- Good using of resources

There are a lot of daily observations showing the motion of objects such as the motion of a ball on pushing it and it stops on catching it, the motion of a bicycle by pushing it and stops on pressing the brakes thus, the objects need an effect to change its state.

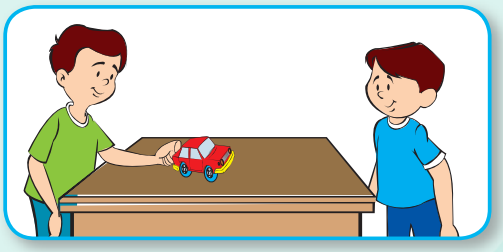
The player pushes a ball

The goal keeper catches a ball

Activity (1): Motion of a car and its rest

- **Materials:** a table - a toy car.
- **Procedures:**

- Stand at one side of a table and ask your classmate to stand in the other side.



- Put the toy car in front of you on the table then push it by your hand in the direction of your classmate.
- Ask your classmate to put his hand in the path of car.
  What do you observe? .....
  Conclusion: .....

The motion of the car and its stopping needs an effect.

Activity (2): Motion of a bicycle and its rest

Look at this picture then answer the following questions:

- How can you move the bicycle?
  .....
- How can you stop the bicycle?
  .....

The motion of the bicycle and its stopping needs an effect.

Changing of objects state from rest to motion or from motion to rest needs an effect and this effect is called "force"

Force: It is an effect that may change the state of the object and it is measured in "Newton".

You knew from your previous study of matter that the measuring unit of length is meter and like this the measuring unit of force is Newton related to the scientist "Isaac Newton".

Games depend on the effect of force:

Activity (3): Pulling of the rope game

Look at this picture that shows two teams (A) and (B).

- Which team that you expect its win ? Why? .....

The motion increases by increasing the force.

- Perform a pulling of rope game with your classmates in school.

Activity (4): Balloon and rocket

- Blow a balloon as shown in the figure then catch its opening by your hand tightly.
- Make the opening of balloon downwards then leave it.

What do you observe?

.....

Conclusion: .....

Force of pushing air downwards moves the balloon upwards like the rocket.

Moving of heavy objects and their rising:

Since four thousand years, ancient Egyptians successed in depending on the effect of force in transferring heavy stones from south of Egypt (Aswan) to Giza and rising of them for building pyramids although there were no modern technology as these days.

Read and learn

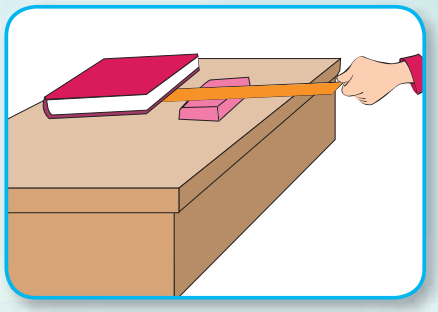
Idea of action of the rocket depends on pushing of gases produced from burning of fuel to downwards so, the rocket ruches to upward.

Activity (5): The effect of force on motion of an object

Materials:

A large wooden ruler - a large rubber (or a small piece of wood of a cylinder shape) - a book.

■ Procedures:



- Put a ruler at its middle on the rubber.
- Put the book over one end of the ruler.
- Press by your hand on the other end of the

What do you observe?.....

Conclusion: .....

Force causes the motion of objects and their rising.

Technological applications:

There are a lot of technological applications that depend in its motion on the effect of the force such as home equipments (mixer - electric fan) and some means of transport (cars-underground).

Underground

An electric fan

A car

A mixer

Exercise

Name equipments and another machines that their action depend on the effect of force in motion of objects.

.....

.....

There are technological applications that their operation depend on the effect of force in rising of heavy objects such as : Crane, electric lift, pulleys and electric ladder.

Lever (Crane)

Electric lift

These machines contain: pulleys that make the motion easy and gears that transfer the motion.

Read and Learn

Your body parts are machines and equipments. Try to match your body parts to some machines and equipments:

Your heart like .....

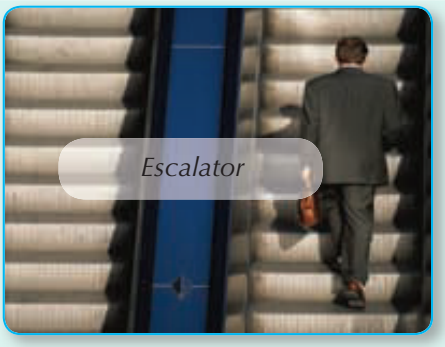
The eye like .....

The arm like .....

Your brain like .....

Your heart like a pump - your eyes like a camera - your arms like a lever - your brain like the computer.

Fishing tool



Escalator

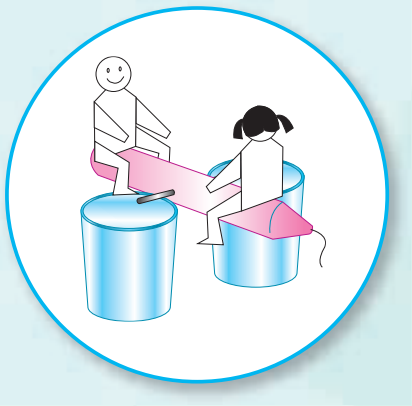
Exercise

A tree fell down in the garden of your school and the teacher asked for you and your classmates to suggest a way to move the tree to the side of the fence of the garden.

What are the suggested alternatives? Examine the correction of these alternatives? Choose the suitable alternative.

.....

Optional Activites



Choose one of the following activities and perform it with your classmates then put it in your portfolio .

(1) The wax seesaw:

- **Materials:** a candle - two cups of pottery - two pieces of paper have a boy and a girl shapes.

(2) Design a tool for rising a heavy object by using some tools of environment.

Summary

- **The force:** it is an effect that changes the state of the object.
- **Force measuring unit:** Newton.
- Train, metro, machines and tools of rising are examples for technological applications that depend on force and motion.

Exercises and Activities

Question (1): **Choose the correct answer:**

1- Force is an effect that change:

A - the motion of object B- state of object

C- rest of object D- all the previous

2- Force measuring unit is the:

A- Kilogram B- Meter C- Newton D-Second

3- Electric fan rotates by the effect of ..... force:

A- water pushing B- air pushing

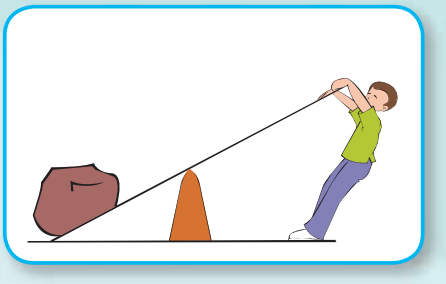
C - motor pushing D - hand Pushing

Question (2): Look at the picture then answer the following:

What do man do by the lever?

.....

What is the benefit of the lever in view your point?



Question (3): The following table contains some things. Write the name of force that moves them from rest.

No	The tool	The effective force
1	A bicycle	
2	A wheel barrow	
3	A kite	
4	A car	

Question (4): By using a rope and pulley how can you rise a heavy object upwards?

Question (5): **Look at the pictures then state the function of each of the following:**

1- Pulley.

2- Gear.

3- Crane.

Question (6): The opposite table shows the results of an experiment to realize the changing of a spring length by the effect of force of different weights. Describe how the length of spring changes by changing the force?

The force (Newton)	length of spring (cm)
Zero	5
0.1	7
0.2	9
0.3	11
0.4	13

Self reflection and Self evaluation

Dear student, after you've finished from studying force and its effect lesson. Fill the following card then add it in your portfolio:

(A) What are the parts that you like in the lesson?

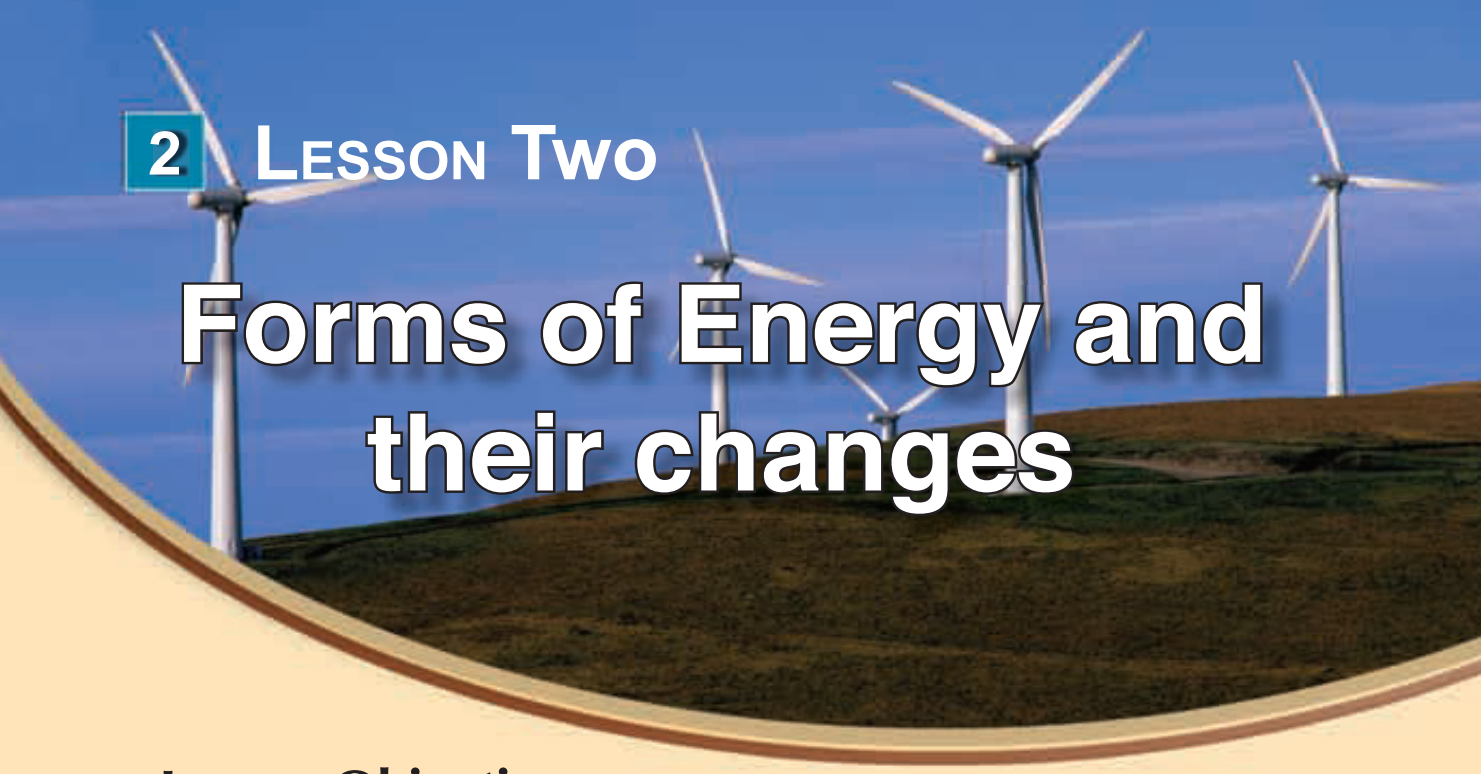
.....

(B) What are the parts that you don't like in the lesson?

.....

(C) What is the activity that you like it in this lesson and perform it? and what is your benefit of it?

.....



2 LESSON TWO

Forms of Energy and their changes

Lesson Objectives

By the end of the lesson, a student will be able to:

1. Explain the concept of energy.
2. Mention examples of different forms of energy.
3. Design simple experiments showing the origin of sound.
4. Mention examples for changes of energy.
5. Identify the ways of energy changes from one form to another.
6. Determine the changes of energy in some equipments.
7. Observe the changes of energy in his environment.
8. Show to his classmates the importance of changes of energy for man and environment.

Lesson Items

- Energy .
- Forms of energy
- Changes of energy

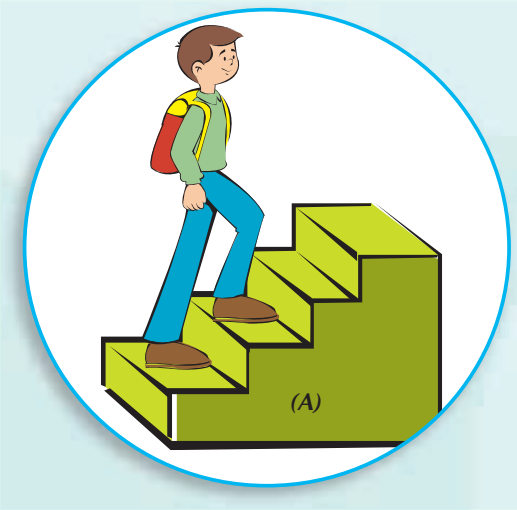
Life Issues

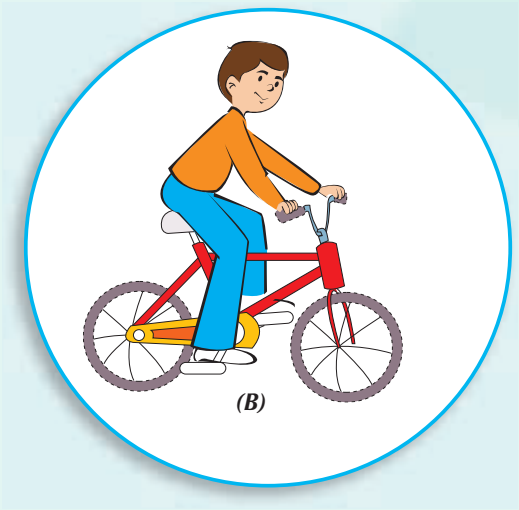
- Rationalizing of energy consumption.

You obtain energy from food that enables you to move, also the car needs fuel as a source of energy that causes its motion and the electric lamp needs an electric energy to light. There are another forms of energy that can be changed from one form to another.

Energy :

Activity (1): Energy meaning





- Look at the pictures in front of you.
- What do the pupil do in picture (A) and the pupil in picture (B)?

Conclusion: .....

- The pupil in picture (A) exerts a work in ascending the ladder and the pupil in picture (B) exerts a work in moving the bicycle.

Energy: It is the ability to do work.

Forms of energy :

There are a lot of equipments in your home which supply us with different forms of energy. Lets us to identify the forms of energy.

Activity (2): The equipments and forms of energy

Look at the following equipments and determine the kind of energy that we get it from each equipment.

Read and Learn

If you was sitting on a chair to watch television or to read a book, do you believe that you exert work or not?

In this case you don't exert a work because you don't move. If you carried a bag in your hand and wait in your place at rest for 30 minutes. During this you don't exert work except during rising the bag.

Toy car

Electric Lamp

Battery (dry cell)

Fan

Heater

Piano

- The spring of a toy car stores ..... energy
- The electric lamp gives ..... energy.

- The electric fan gives..... energy
- The electric heater gives..... energy
- The Piano gives ..... energy
- The dry cell gives ..... energy

Conclusion: .....

The are several forms of energy:

1- **Potential energy: Like the energy stored in a spring of a toy car.**

2- **Light energy: Like the energy produced from the electric lamp.**

3- **Kinetic energy: like the energy produced from the electric fan.**

4- **Heat energy: Like the energy produced from the heater.**

5- **Sound energy: like the energy produced from the Piano.**

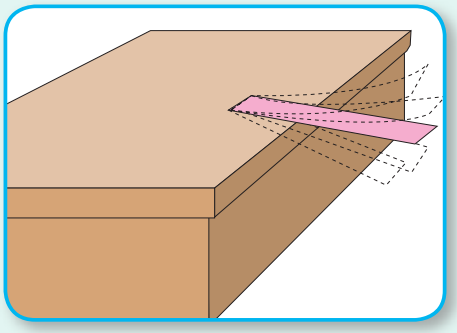
6- **Electric energy: Like the energy produced from the dry cell.**

All these equipments have ability to do work.

Sound energy:

Perform the following activity to show sound energy meaning:

Activity (3) :



■ **Materials:**

A wooden ruler - a table .

■ **Procedures:**

- Fix one end of the wooden ruler on the table.
- Pull the other end downwards then leave it.

What do you hear?.....
Vibration of the ruler produces sound.
Conclusion: .....

Sound is a form of energy, That reaches ear causing hearing.

Read and Learn

Sound is produced from vibration of objects.

Touch your larynx by the tips of your fingers while you are speaking.

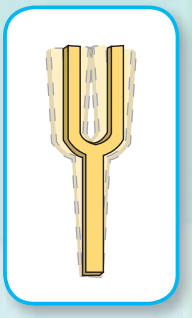
Is the larynx vibrate? The larynx moves and the vibrations inside the larynx causes the occurrence of sound, and when you put your hand an a speaker produces sound you found it vibrates. So that, sound is produced due to vibration of objects.

Activity (4): Sound and vibration of objects

■ **Materials:**

A tuning fork.

■ **Procedures:**



- Catch the handle of the tuning fork and tap it on a wooden table.
- Close the two prongs of the tuning fork to one of your ears quickly.

  Have you hear a sound? .....
- Touch one of the prongs of the fork by your finger after tapping it.

  What do you feel? .....

  Conclusion: .....

  You hear a sound when you tap the tuning fork and feel by vibration of its prongs when you touch it.

Sound is produced due to vibration of objects.

Changes of energy:

There are a lot of equipments that change the energy from one form to another.

1- Changing of potential energy into kinetic energy

Carry out the following activity to prove the change of potential energy into kinetic energy:

Activity (5): Changing of potential energy into kinetic energy :

- Bring a toy car that works by spring.
- Fill the spring then put the car on a table.

  What do you observe? .....

  Conclusion: .....

On rotating the spring, work is exerted and kept in it as potential energy and on leaving it potential energy changes into kinetic energy that causes the motion of the car.

Potential energy changes into kinetic energy in spring of children toys.

Read and Learn

There is an electric generator in the car to feed the battery by electric energy. The battery gives this energy to motor which change the electric energy into kinetic energy that rotates the motor to push the car, then it moves.

2- Changes of kinetic energy:

Activity (6): Changing of kinetic energy into sound energy :

Attention!

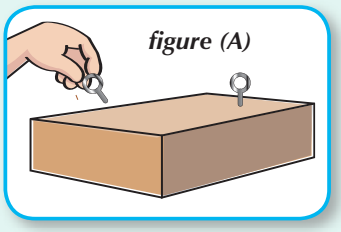
Take care on using the hammer

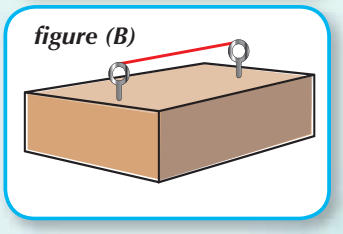
■ Materials:

A rubber band - two nails -a piece of wood (its length 30 cm)- a small hammer.

■ Procedures:

- Fix the two nails in the piece of wood at a distance of 25 cm by the hammer.
- Tie the two ends of the rubber band in the two nails as figure (A).
- Pull the rubber band then leave it as figure (B)





What do you hear ? .....

Conclusion: .....

Kinetic energy of rubber band is changed into sound energy that you hear it.

Activity (7): Changing of kinetic energy into heat energy:

Rub your hands together.

What do you feel? .....

Conclusion: .....

Kinetic energy of your hands is changed into heat energy.

Activity (8): Changing of kinetic energy into electric energy

On increasing the speed of the bicycle, you notice the increase in lamp lighting of the bicycle.

- Have you know why? .....

There is a small equipment touches the tire called "Dynamo" that changes kinetic energy of the tire into electric energy that causes the lighting of the lamp.

Conclusion: .....

In Dynamo, kinetic energy changes into electric energy.

3- Changes of electric energy:

Changing of electric energy into light energy:

On passing of an electric current in a lamp, it lights up.

In electric lamp, electric energy changes into light energy.

Activity (9): Changing of electric energy into kinetic energy

Switch on the electric fan in your school laboratory or in your home.

What do you observe? .....

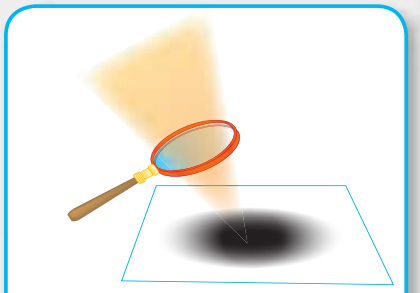
Conclusion: .....

Passing of an electric current in the motor of fan causes its rotation.

In the motor of fan, electric energy changes into kinetic energy.

4- Changes of light energy:

Activity (10): Changing of light energy into heat energy



(A convergent lens)

- **Materials:** a convergent lens - a paper.
- **Procedures:**

Put the lens over the paper.

- Expose the lens to sun rays for a period of time.

What do you observe? .....

Conclusion: .....

Light energy of the sun changes into heat energy by the magnifying lens(convergent lens) .

Changing of light energy into electric energy:

Solar cells

Solar cells are used in getting electric energy from light energy, and the benefit of this is providing artificial satellites by electric energy for operating their equipments and generating electric energy that is used in homes.

In solar cells, light energy changes into electric energy.

Optional Activities

Choose one of the following activities then perform it, then put it in your portfolio.

(1) Design a fan: Use the following tools in making an electric fan.

- **Materials:** a motor of a toy - a paper fan - a battery - a sticking tape - two pieces of connection wires.

(2) Design a string tool:

- Use these tools: Thin plastic threads - nails - a hammer - a plate of wood (30 cm)

Summary

- **Energy:** It is the ability to do work.
- **Sound:** It is a form of energy that reaches to ear causing the hearing and it originates from the vibration of objects.
- **Changes of energy:**

Equipment	Used energy	Produced energy	equipment	Used energy	Produced energy
Fan	Electric	Kinetic	Motor	Electric	Kinetic
Lamp	Electric	Light	Violin	Kinetic	Sound
Heater	Electric	Heat	Solar cell	Light	Electric
Radio	Electric	Sound	Solar heater	Light	Heat
Dynamo	Kinetic	Electric	Battery	Chemical	Electric

Exercises and Activities

***Question (1):* Complete the following statements:**

1- Energy is the ability to do..... .

2- From the forms of energy ....., ..., ...

3- In electric lamp, electric energy changes into ..... energy.

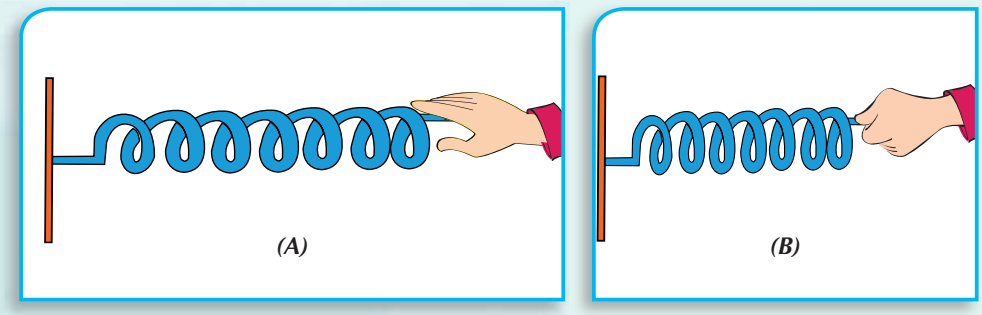
4- Sound originates due to ..... .

5- In the motor of a car, electric energy changes into ..... energy.

6- Light energy changes into electric energy in ..... .

Question (2): On removing a nail from a wooden plate, the nail becomes warm. Explain why?

Question (3):



- Spring (A) and Spring (B) are similar, then spring (A) is pressed a little and fixed in its place, and the spring (B) is pressed by a larger degree and fixed in its place.
- What is the name of the energy stored in each spring?
- What is the spring that store a larger amount of energy?

***Question (4):* What happens when.....?**

1- Sun rays fall on a convergent lens that put over a paper?

2- A piece of rubber is pulled and fixed from its ends then leaving it?

***Question (5):* By an experiment, prove each of the following:**

1- Sound is produced due to vibration of objects.

2- Potential energy changes to kinetic energy.

3- Electric energy changes to light energy.

***Question (6):* Mention the changes of energy in the following cases:**

1- On going to school by a bicycle .

2- Lighting of an electric lamp in your classroom.

3- Operating the electric fan when you return to home.

***Question (7):* Make a fan by using of the following tools:**

- **A small motor.**
- **Cartoon paper.**
- **A battery.**
- **Connection wire.**
- **Scissors.**

Self reflection and Self evaluation

Dear student , after you've finished the energy and its forms lesson, fill the following card then add it in your portfolio:

(A) What are the parts that you like in the lesson?

.....

(B) What are the parts that you don't like in the lesson?

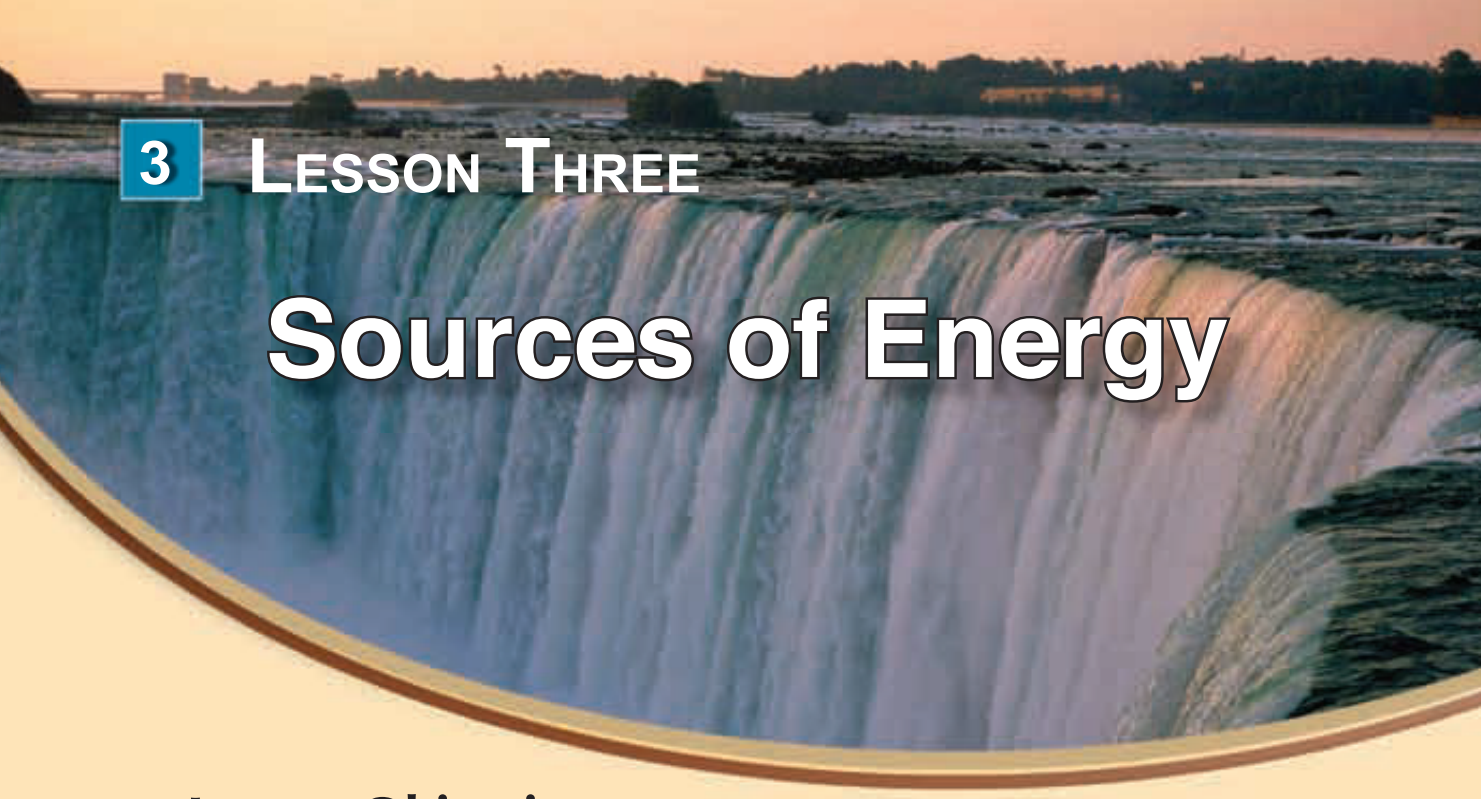
.....

(C) what are the important information that you get about energy and its forms?

.....

(D) Mention some equipments in your home that change energy from one form to another.

.....



3 LESSON THREE

Sources of Energy

Lesson Objectives

By the end of the lesson, a student will be able to:

1. Identify the importance of the sun
2. Prove by examples that the sun is the main source of energy on the surface of earth.
3. Determine the benefits of solar energy.
4. Give examples for renewable and non-renewable resources of energy.
5. Mention examples for some machines depend on the non-renewable resources of energy.
6. Appreciate the role of government and its efforts in supplying fuel. .

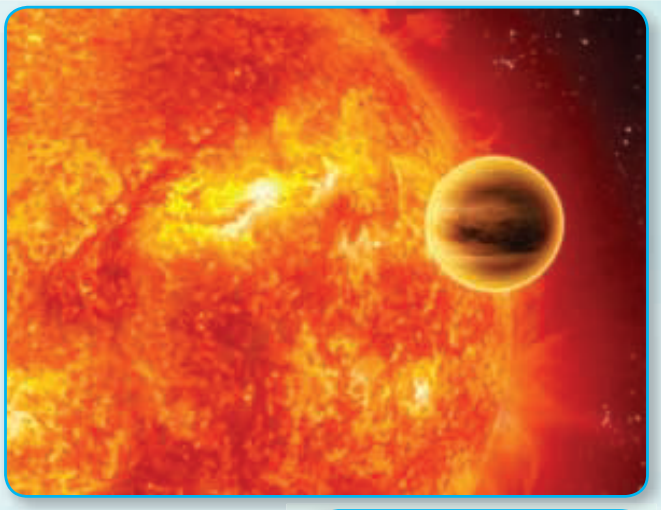
Lesson Items

- Sun is the main source of energy.
- Benefits and importance of solar energy.
- Sources of energy.
- Tools and non- renewable resources of energy.

Life Issues

- Renewable energies

Sun provides us by heat and light. Plants depend on it in making their food. Without the sun, the wind, clouds and rain are not produced. So sun is considered as a main source for all energies.



Activity (1): Sun and living organisms

If there is no sun , what do you expect to happen for plants?

.....

What do you feel when the sun go for a long period of time in winter?

.....

Conclusion: .....

Sun is necessary for growth of plants and human's life.

Activity (2): Sun and formation of clouds and rain

Look at the picture in front of you. How are the clouds form?

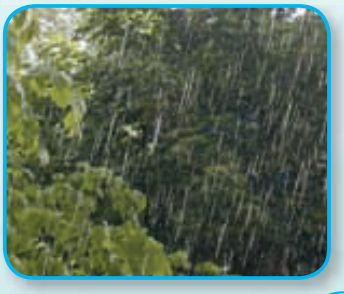
.....

How are the clouds change to rain? .....

.....

Conclusion: .....

Sun's heat is responsible for the evaporation of water of seas, oceans and rivers forming clouds and this is the reason of motion of wind that changes clouds to rain.



Activity (3): Sun and fuel

Is the sun has a role in the formation of petroleum and coal?

.....

The sun is the main reason in the formation of petroleum and coal and they are products of the plants and animals that were burried under the earth's surface.

Petroleum field

■ **General conclusion:**

Sun is the main source of energy on the Earth's surface.

Activity (4): Getting of electricity

Look at the picture of a solar cell. This cell changes light of the sun to another kind of energy.

What is the name of the produced energy?

.....

Solar cells

Solar cell changes light energy into electric energy directly.

Scientists have used the wind that produced by sun in rotating the wind mills to rotate turbines for generating electricity.

Wind mills

The sun generates wind that rotates turbines for generating electricity.

Activity (5): The Warming

Look at the picture of the solar heater which used to warm homes.

What is the kind of energy produced from the heater? .....

A solar heater

Solar heaters change solar energy into heat energy that is used for warming and heating of water.

Exercise

Suggest a way for saving energy in your country.

Machines operation

This car works by benzene which is one of the products that is formed by the action of the sun.

Sun is one of the main factors in the formation of fuel that is used in machines operation.

Read and Learn

Petroleum is the remains of animals that are fed on plants then are buried under the earth's surface since millions of years and are decomposed under the effect of high pressure and temperature into petroleum.

Importance and benefits of solar energy:

1- It provides us by heat to warm our bodies.
2- It provides us by light for vision and working .
3- It helps the plant to make its food.
4- It is the main source of generating wind helping us in getting of electricity.
5- It helps in the formation of fuel to operate tools and machines.

Read and Learn

Sun emits ultraviolet rays helps in the formation of vitamin "D" that is necessary for bones growth. So it is advised to expose children to sun rays for suitable periods of time.

Sources of energy:

All the countries worried from the decreasing of petroleum that is one of non-renewable resources of energy. So, the countries try to search about renewable resources of energy such as wind, rising and ebb tides, and water falls.

First: Renewable resources of energy:

They are the sources that continually renew themselves:

1- **Wind:** It is used in rotating wind mills for generating electricity.

2- **Rising and ebb tides energy:** You have studied in the unit of universe that the moon causes the, occurrence of rising and ebb tides this means that it causes the rising of the level of sea then its returning back. This energy is used in rotating turbines to produce electricity.

3- **Waterfalls energy:** Falling of water from the waterfall generates energy that moves the turbine for generating electricity.

The rising tide

The ebb tide

Waterfalls

Second: Non-renewable resources of energy:

They are the sources that don't renew themselves and they may be exhausted by the continuous using of them, like:

1- Coal. 2- Petroleum.

3- Natural gas.

Marine Petroleum Field

Machines and non - renewable resources of energy:

A lot of machines and means of transport depend on the non - renewable resources of energy, like:

- Cars that work by benzene or natural gas.
- Aeroplanes that work by benzene.
- Irrigation machines that work by kerosene.

Natural gas is one of the more cleanest forms of fuel. The government exerts great efforts for providing and increasing its production due to its cleanliness for keeping the environment from pollution.

Read and Learn

Most of developed countries tend to get electricity from nuclear energy to face the increase in consumption of electric energy.

Optional Activities

Choose one of the following activities and perform it with your classmates then put it in your portfolio.

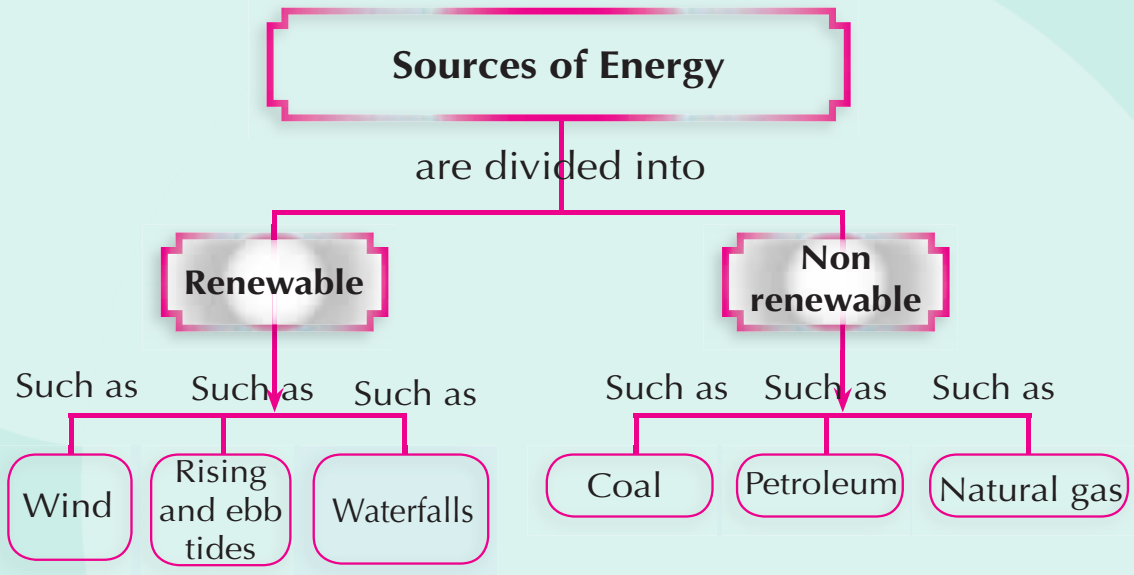
(1) Design a model of turbine action that work by rotation of a fan through two ways:

- A fan made of cartoon and water falls down from a tap.
- A fan of cartoon and pushing of air from your mouth.

(2) Imagine that you are a non renewable resource of energy. What do you say to your classmates for keeping energy and cleanliness of the environment

Summary

- **The Sun:** It is the main source of energy on the surface of Earth.
- **Benefits of solar energy:** It provides us with light and heat - forms clouds, wind and rain - causes the formation of fuel.
- **Renewable energy:** It is the energy that renew itself.
- **Non- renewable energy:** It is the energy that can't renew itself and may be exhausted by continous consumption.
- Turbines, cars, rockets and planes work by non- renewable resources of energy.



Exercises and Activities

Question (1): **What happens when .....?**

1- The sun is absent from the Earth.

2- Petroleum is run out of from Earth Surface.

Question (2): **Put (✓) Or (✗), then correct the wrong sentences:**

1- Sun is the main source of energy on the surface of Earth. ( )

2- Plant grows in the presence of sunlight. ( )

3- Wind is one of non- renewable resources of energy. ( )

4- Sun and petroleum from renewable resources of energy. ( )

5- Car motor works by natural gas or benzene. ( )

Question (3): Give reason: Attention of government by using natural gas instead of benzene in means of transportation.

Question (4): **Write the scientific term:**

1- Sources include coal, petroleum and natural gas.

2- The main source of energy on the Earth's surface.

3- A fuel from the cleanest non-renewable resources of energy.

Question (5): Collect with your classmates a number of photos for machines that work by renewable resources of energy and another work by non. renewable resources of energy. Name the energy that the machine works by it.

Question (6): How we obtain electricity from: sun, moon, waterfalls and wind?

Question (7): **Which of the following groups are considered as renewable resources of energy:**

A- Wind, waterfalls, rising and ebb tides.

B- Natural gas, sun, rising and ebb tides.

C- Coal, petroleum and natural gas.

D- Sun, petroleum and ground heat.

Question (8): Petroleum is an example of natural non - renewable resources of energy. Which of the following is considered as another example for non - renewable resources of energy?

A- Sea water **B-** Sunlight

C- Coal **D-** Wind

Self reflection and Self evaluation

After you've finished the studying sources of energy lesson, fill the following card and add it in your portfolio:

A- what are the parts that you like in the lesson?

.....

B- what are the parts that you don' t like in the lesson?

.....

C- Are you benefit from your studying of this lesson in rationalizing your the consumption of energy?

.....

4 Lesson Four

The Electricity

Lesson Objectives

By the end of the lesson, a student will be able to:

1. Explain the concept of static electricity and current electricity.
2. Mention the phenomena related to static electricity.
3. Design activities for generation of static electricity.
4. Explain the attraction of small bits of paper to a charged ruler.
5. Compare between static electricity and current electricity.
6. Give examples for electric equipments that are used at home.
7. Show the importance of electricity in life and its using in environment.

Lesson Items

- Static electricity
- Current electricity
- Domestic electric equipments.

Life Issues

- Rationalizing the consumption of electricity.

Most of equipments at home work by electricity such as television, computer and refrigerator. These equipments need wires to connect them by electricity and this type of electricity is called «current electricity».

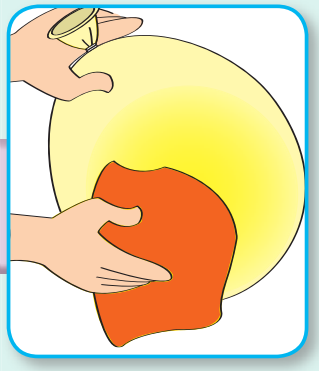
There is another kind of electricity does not flow in wires and is called «static electricity»

Here are some phenomena related to static electricity such as:

- The vision of light in the sky that is called "lightning".
- Standing of your hair when you combing it by a plastic comb.
- Hearing a sound when you putting off your clothes in some days or vision of a flash.

What is the reason of occurrence of those phenomena in your opinion? .....
.....

- Formation of electric charges is the reason of these phenomena and these charges are called static electricity.



Static electricity: It is formed from electric charges that remain on an object.

Static electricity generation

Activity (1): Balloon and generation of electricity

- **Materials:** a balloon - a piece of wool -a little amount of powdered sugar - a thread.

■ **Procedures:**

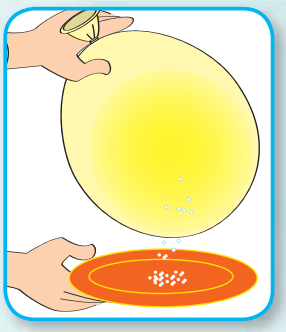
- Blow a balloon and tie its opening by a thread.
- Rub the balloon by the piece of wool.
- Close the balloon to sugar.

What do you observe? .....

What is your explanation for that?

.....

Conclusion: .....



■ **Explanation:**

On rubbing a balloon by a piece of wool, electric charges are formed on its surface and attract sugar to them.

Read and Learn

Light of lightning:

Lightning happens when negative electric charges found in clouds meet with positive electric charges rising from earth.

Activity (2): Small bits of paper and the charged ruler

■ **Materials:** a plastic ruler - small bits of paper

■ **Procedures:**

- Close the ruler to the small bits of paper

Are the bits of paper move or not? .....

- Rub the ruler by you hair several times.
- Close the ruler to the small bits of paper.

What do you observe? .....

Explanation: .....

Before rubbing the ruler, there is no electric charges on the ruler, while after the rubbing electric charges are formed on ruler that attracted the small bits of paper to them.

Rubbing of objects generates static electricity.

Current electricity (Dynamic)

Perform the following activity to know the concept of current electricity:

Activity (3): Electric current

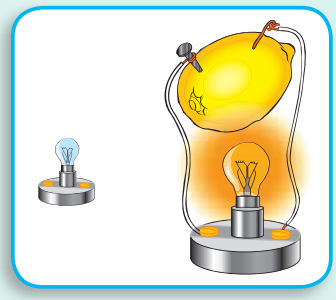
- **Materials:** a pocket torch - a battery for the torch.
- **Procedures:** Put the battery inside the torch then press on its key, what happens to its lamp? .....

Explanation: .....

The battery pushes electric charges in wires (good conductors of electricity) that reaches to the lamp causing its lighting and an electric current flows in one direction, so that it is called a direct current.

Current electricity: They are electric charges that flow through connecting wires for long distances.

Activity (4): Make a battery from a lemon



- **Materials:** a flexible lemon - a rod of copper - a rod of zinc (or an iron nail) - a lamp with a base - connection wires.
- **Procedures:**

- Press on the lemon several times until it becomes flexible.
- Put the copper rod far from the zinc rod by 3 cm in the lemon
- Connect the rods by the lamp as shown in the figure.

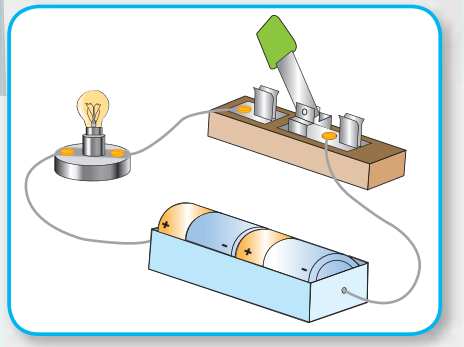
What do you observe? .....

Conclusion: .....

Exercise

Plan for similar activity by using an orange or another fruit. Think with your classmates.

Activity (5): Formation of an electric circuit



■ **Material:** a battery - a lamp with a base - connecting wires have uncovered ends - electric switch.

■ **Procedures:**

- Set up an electric circuit as shown in the opposite figure.

Perform the following steps in the table and record your observations about the state of lamp in each step.

Attention

Don't use the electricity of homes in performance of this activity or any other activities.

Steps of performance	State of lamp	
	Light	Do not light
1- On closing the circuit by the switch .		
2- On opening the circuit by the switch.		
3- On removing the battery then closing the circuit.		
4- On connecting the battery and closing the circuit.		

In light of your observations, answer the following questions:

What is the function of battery? .....

What is the benefit of switch? .....

What is the importance of connecting wires? .....

- **The battery:** It is the source of electric current.
- **The switch:** It is used to close and open the electric circuit.
- **The wires:** They are used to transfer electric current from battery to lamp.
- **The electric circuit:** It is the path of electric current.

The electric equipments used at home

Mention some equipments that are present at your home and work by electricity? .....

From examples of these equipments:

Television

Washing machine

Heater

Refrigerator

Computer

Read and Learn

Some inventors of electric equipment:

Marconi: The inventor of radio, he was born in Bolivia in 1874.

Jon Bird: The inventor of television, he was born in Britain in 1888 - 1946.

Volta: The first inventor of generating electric current in 1800.

Exercise

Compare between static electricity and current electricity.

Optional Activities

Choose one of the following activities then perform it and put it in your portfolio.

1- During your exit from your school look at one of the shops of electrical equipments and write the name of equipments which working by electricity .

2- Make a battery from some fruits like an orange.

Summary

- **Static electricity:** It is the electric charges that remain on an object.

  - The charged ruler: It attracts uncharged small bits of paper.

- **Current electricity:** It is the electric charges that flow through connecting wires.

  - **The electric current:** It is movable electric charges.

  - **The electric circuit:** It is the path of electric current.

  - Most of equipments at home work by electricity.

Exercises and Activities

Question (1): what happens when....?

1- Rubbing your hair by a plastic comb.

2- Rubbing a plastic ruler by a piece of wool.

3- Rubbing a flattened balloon by a piece of wool then closing it to your hair.

4- Removing the battery from a closed electric circuit.

Question (2): What is the result of ....?

1- Closing a charged balloon to a wall.

2- Insert a copper plate and another zinc plate in a lemon then touch them by your tongue.

3- The absence of a switch in an electric circuit.

Question (3): What is meant by ....?

1- Static electricity. **2-** Dynamic electricity (current).

3- Electric circuit.

Question (4): Compare between the static electricity and current electricity.

Question (5): **Give reasons:**

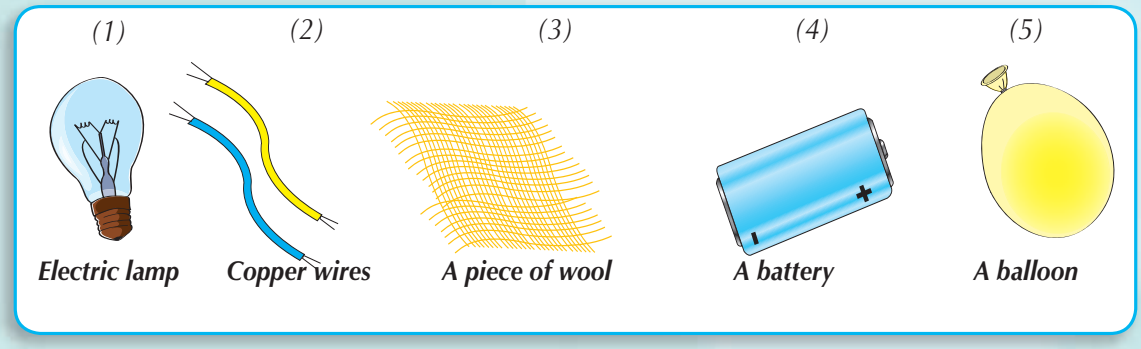
1- Attracting the small bits of paper to a ruler that was rubbed by your hair.

2- Attracting a balloon rubbed by the wool to a wall.

3- It is forbidden to use electric current at home for performing an activity.

Question (6): Suggest a way to decrease the consumption of electricity.

Question (7): Examine the following shapes:



- Which of them can be used together to make an electric circuit .....?

(a) 1، 3 ، 4 **(b)** 1 ، 2 ، 4 **(c)** 1 ، 2، 3 **(d)** 1، 4 ، 5

- Which of them can be used together in generating static electricity ..... ?

(a) 2 , 1 **(b)** 3 , 2 **(c)** 3 , 4 **(d)** 3 , 5

Self reflection and Self evaluation

After you've finished the studying electricity lesson fill the following card then add it in your portfolio:

(A) what are the parts that you like in the lesson?

.....

(B) what are the parts that you dislike in the lesson?

.....

(C) what is the benefit of electricity in your life?

.....

(D) what are you doing to rationalize the consumption of electricity at your home?

.....

General Exercises on Unit (2)

Question (1): **Put (✓) or (✗) in front of the following sentences:**

(a) Sound stops when the vibration of tunning fork stops.( )

(b) Natural gas is considered as the cleanest type of fuel. ( )

(c) On filling the spring of a toy car, kinetic energy changes into potential energy. ( )

(d) Small bits of paper are attracted to a rubbed plastic ruler.( )

(e) Sun provides us only with light energy. ( )

Question (2): **What is the name of produced energy when...?**

(a) Rubbing your hands together.

(b) Knocking on the door of classroom.

(c) Running of a pupil.

(d) Pulling of a string .

(e) Ringing of a school bell.

(f) Lighting of an electric lamp.

***Question (3):* Complete the following sentences:**

1- Rising and ebb tides happen by the effect of ..... .

2- Sound originates from ..... .

3- Energy is the ability to do ..... .

4- The main source of energy on the Earth's surface is .....

5- We get ..... energy from the solar cells.

6- Wind mills are used in .....

***Question (4):* Your classmate classified some sources of energy into two groups (A) and (B) in the following table:**

What is the scientific base that your classmate depends on it in classification of two groups?

(A)	(B)
Wind Rising and ebb tides Waterfalls	Coal Petroleum Natural gas

Question (5): **Give reasons:**

1- Attraction small bits of paper to a rubbed ruler by your hair.

2- You hear sound when you tap a turning fork.

3- When you ride a bicycle, some changes of energy happen.

4- It is preferred to use natural gas other than coal.

5- Force is an effect that changes the state of an object.

Question (6): **Choose the correct answer:**

1- Wind mills move by the pushing force of .....

(a) the hand. **(b)** the motor.

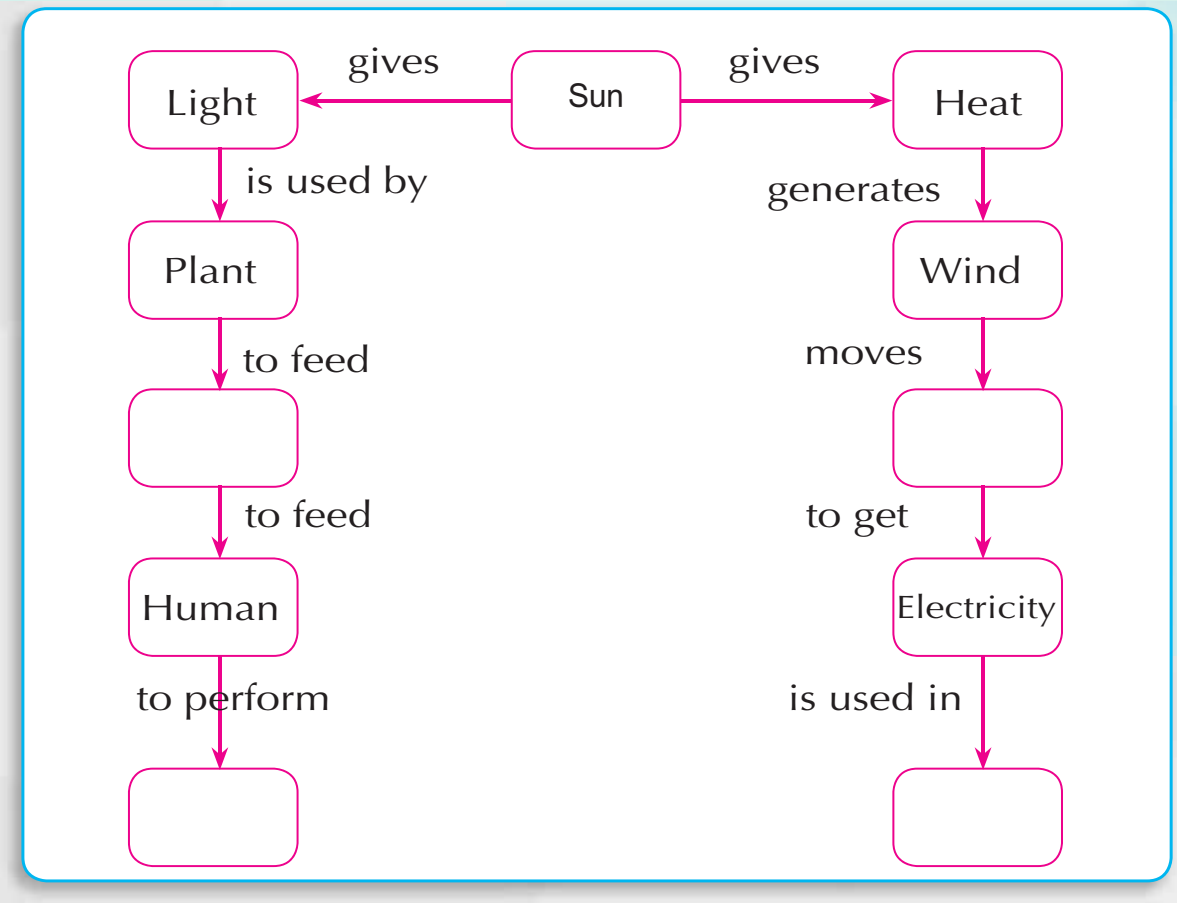
(c) the wind. **(d)** the water.

2- Force is measured in ..... unit.

(a) Newton **(b)** m/sec

(c) cm **(d)** kg

Question (7): Complete the following chart:



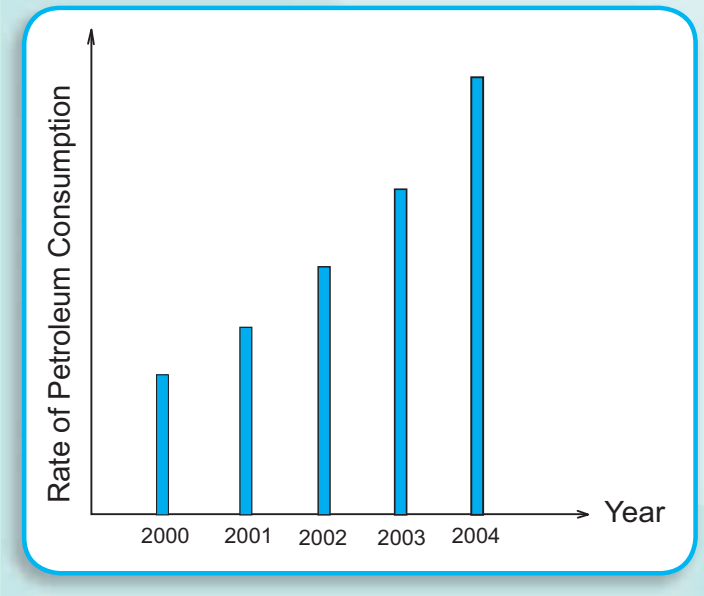
Question (8): What is meant by .....?

1- Force.

2- Static electricity.

3- Current electricity.

4- Sound.



Question (9): **Examine the following graph then find:**

(a) The year of the least consumption of petroleum.

(b) How to decrease the consumption of petroleum?

Question (10): The teacher asks one of your classmates to mention an example for changing electric energy to another energy. Your classmate answers (wind energy rotates wind mills to generate electricity).

What is your opinion in the answer of your classmate? Mention another example.

Question (11): **What happens when ....?**

1- Absence of sun from Earth for one day.

2- Cutting off electric current from your home for one day.

3- Absence of benzene and natural gas for several days.

Question (12): **In Egypt we have renewable and non - renewable resources of energy.**

(a) Mention some non - renewable resources of energy that are used at your home.

(b) What are the renewable resources of energy used at your home?

Question (13): **What is the result of ..... ?**

1- The dependence on the non - renewable resources of energy only.

2- Closing a ruler rubbed by a piece of wool to small bits of paper.

3- Pulling the free end of a vertically hanged spring then leaving it free.

4- Good using of electricity.

Question (14): **Prove by a practical activity each of the following:**

1- Force changes the state of an object.

2- Showing the meaning of kinetic energy and potential energy.

3- Designing a battery by using a potato tuber.

4- Designing an electric circuit for lighting an electric lamp.

General Exercises on the Second Term
[Exercise (1)]

***Question (1):* Complete the following sentences:**

1- Plant cells are characterized from animal cells by the presence of ..... and .....

2- Small intestine is divided into .....and..... .

3- The main source of energy on the Earth's surface is the .....

4- Food chain begins with ..... and ends with.....

5- Sound generates due to ..... .

6- The building unit of a living organism is called ..... .

7- The ..... is from the cleanest forms of energy.

8- Photosynthesis process produces..... and ..... .

Question (2):

(a) What is the role of the following organs .....?

1- Stomach. **2-** Small intestine.

(b) What happens in the following cases .....?

1- Putting some small nails inside a can then shaking it.

2- Removing a nail from a wooden plate then touching it by your hand

3- Switching on a heater.

***Question (3):* Choose the correct answer:**

1- In the respiratory system, gas exchange process takes place in the .....

(a) trachea **(b)** nose

(c) air sacs **(d)** two bronchi

2- Sail boats move on the surface of river Nile by the force of pushing .....

(a) water **(b)** wind

(c) ropes **(d)** motor

3- Which of the following is considered as an organ .....?

(a) yeast fungus **(b)** heart

(c) epidermis of onion plant **(d)** bean plant

4- Sound is a form of .....

(a) mass **(b)** speed

(c) energy **(d)** motion

5- All the following living organisms are producers except .....

(a) green algae **(b)** maize plant

(c) bread mould **(d)** wheat plant

6- Force is measured in .....

(a) Newton **(b)** kg

(c) km **(d)** m/sec

7- On vibration of a spring, an exchange happens between .....

(a) potential energy and electric energy.

(b) potential energy and kinetic energy.

(c) potential energy and heat energy.

(d) potential energy and light energy.

8- A tissue is .....

(a) a group of similar cells in structure and function.

(b) a group of different cells in structure and function.

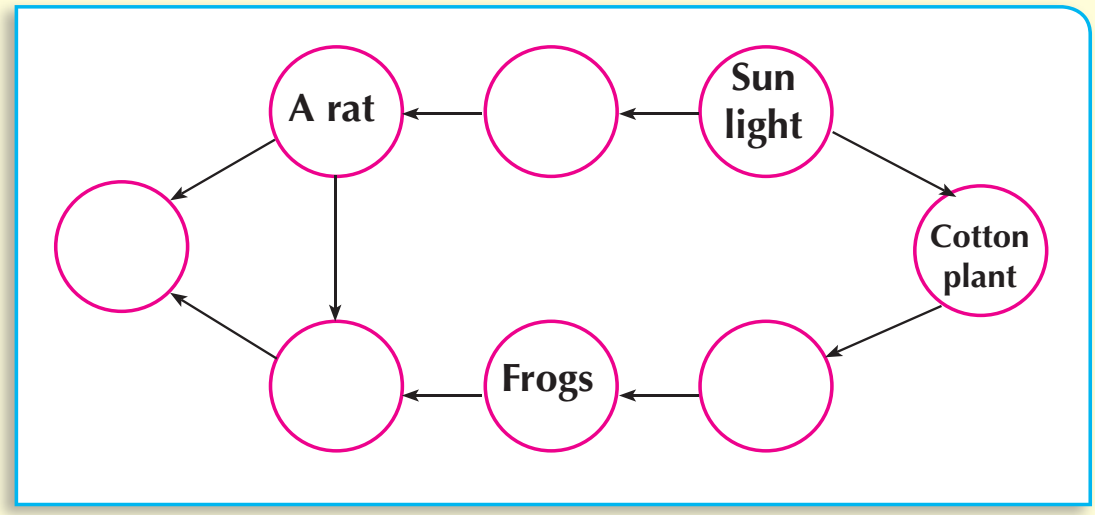
(c) a group of organs.

(d) a group of systems

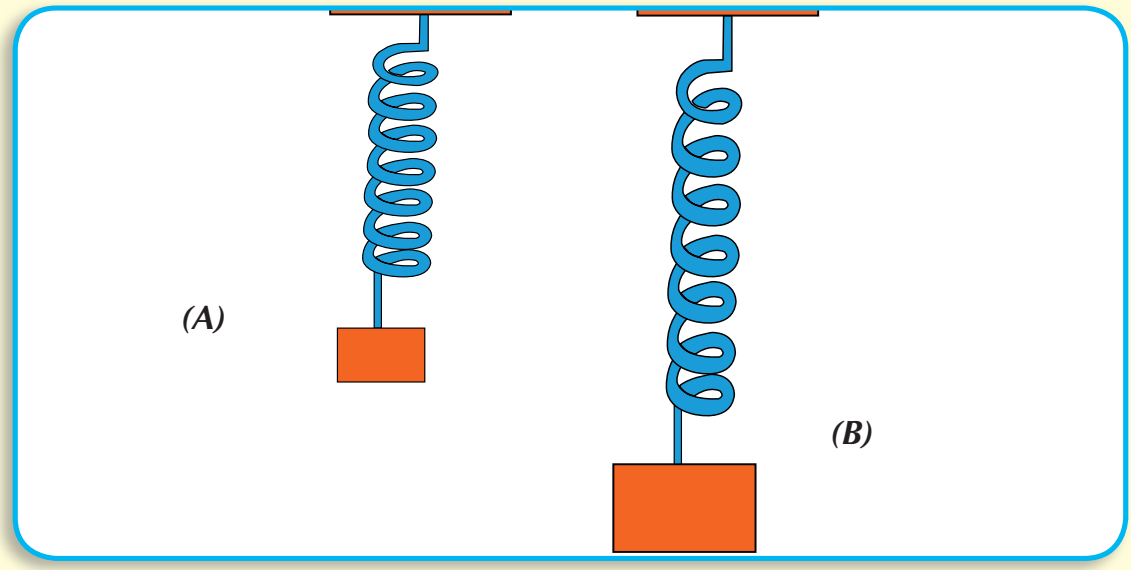
Question (4):

(a) Place the following living organisms in their suitable places for formation of a food chain:

(Falcon - Wheat plant - Snake - Locust)



(b)



The two springs (A), (B) are similar. A weight was hung in the end of each one then fixed as shown in the figure.

1- What is the name of energy that stored in each spring?

2- What is the spring that store more energy?

3- What happens if each of them is left free?

Question (5): **Give reasons:**

1- Food spoils if it is left outside the refrigerator for a long period of time.

2- Attraction of small bits of paper to a rubbed ruler by your hair.

3- Proteins are digested in stomach and small intestine.

4- Battery is a main part in the electric circuit.

Question (6): **What is the name of the produced energy....?**

(a) Rotation of a dynamo coil.

(b) knocking on the door of classroom.

(c) Passing of an electric current in an electric lamp.

[Exercise (2)]

Question (1):

Complete the following sentences :

1- From the functions of the large intestine are ..... and .....

2- Pharynx is a common cavity leads to ..... and .....

3- ..... are located inside thoracic cavity and surrounded by .....

4- ..... is separated between thoracic cavity and abdominal cavity.

5- The organ of the body of the living organism is formed from .....

6- Each tissue is formed from identical units of .....

7- The plant consumes ..... gas that found in the atmosphere during photosynthesis process.

8- In the green plant , the .....energy changes into ..... energy stored in the form of food.

9- In the motor of the car, the ..... energy changed into ..... energy.

10- Sound originates due to .....

Question (2):

Choose the correct answer :

1- Digested food is absorbed in the .....

(a) mouth. (b) stomach.

(c) small intestine. (d) large intestine.

2- The number of respiration times increases in ..... case.

(a) sitting. (b) running.

(c) sleeping. (d) standing.

3- Yeast fungus is used in manufacturing of .....

(a) wood. (b) paper.

(c) glass. (d) alcohol.

4- During photosynthesis process ..... gas is evolved.

(a) carbon dioxide. (b) nitrogen.

(c) oxygen. (d) chlorine.

5- Lung is considered from components of ..... system.

(a) digestive. (b) reproductive.

(b)nervous. (d) respiratory.

6- Electric washing machine rotates by effect of pushing force of…..

(a) water. (b) motor.

(c) air. (d) hand.

7- From examples of electric energy, the energy produced from ……

(a) piano. (b) fan.

(c) battery. (d) heater.

8- From renewable energy resources is ……

(a) coal. (b) wind.

(c) petroleum. (d) natural gas.

9- From the permanent sources of energy is ……..

(a) wind. (b) sun.

(c) ebb and tides. (d) waterfalls.

10- Which of the following living organisms is not producer of food?

(a) Green algae. (b) Wheat plant.

(c) Corn plant. (d) Fungus.

Question (3):

A- What is the role of each of the following :

1- Bile juice in digestion process.

.....

.....

2- Diaphragm in mechanism of respiration.

.....

.....

B- Give reason for each of the following :

1- It is preferred to breathe through the nose not through the mouth.

.....

.....

2- Green plants are called autotrophic organisms.

.....

.....

3- The kite rises up to the top.

.....

.....

4- On rubbing your hands together, you feel with heat.

.....

.....

5- Nuclear energy is considered from non-renewable resources of energy.

.....

.....

6- Sound that originates from vibration of tuning fork stopped when you touch it by your hand.

.....

.....

7- Teeth are formed from incisors, canines and molars.

.....

.....

8- It's preferred for human to skip being in crowded places.

.....

.....

9-The sun is the main source of energy on the Earth's surface.

.....

.....

10- Attraction of small bits of paper to a rubbing plastic ruler.

.....

.....

11- It's preferred to use natural gas than coal.

.....

.....

12- The presence of switch in an electric circuit.

.....

.....

13- Importance of battery in the electric circuit.

.....

.....

Question (4):

Compare between all the following :

1-Bile juice and pancreatic juice.

.....

.....

2-Inhalation process and exhalation process in the mechanism of respiration.

.....

.....

3- Animal cell and plant cell.

.....

.....

4- Producers and decomposers.

.....

.....

5- Potential energy and kinetic energy.

.....

.....

6- Static electricity and current electricity.

.....

.....

Question (5):

What happens in the following cases :

1- Tongue is not found in the mouth.

.....

.....

2- If the microscope is not discovered.

.....

.....

3- Disappearing of decomposers from the environment.

.....

.....

4- If there is not blood capillaries in the nose.

.....

.....

5- Absence of Sun from Earth.

.....

.....

Question (6):

Correct the following statements :

1- A complete digestion of protein substances occurs in stomach.

.....

2- Salivary glands secrete a fluid containing digestive substances for fats.

.....

3- Air carrying oxygen gas transfers from lungs to outside through the nose.

.....

4- Plasma membrane fills the cell cavity and all vital process is completed in it.

.....

5- Algae are considered from consumers.

.....

6- Food web is paths that show the energy transference in the form of food from living organism into another.

.....

7- Kilogram is the measuring unit of force.

.....

8- Energy is the ability to do force.

.....

9- Wind is from non - renewable energy resources.

.....

10- Sun provides us with light energy only.

.....

11- Static electricity is movable electric charges.

.....

[Exercise (3)]

Question (1):

Choose the correct answer from those between brackets :

1- The function of the nervous system is ……

(digestion – sensation – excretion)

2- A system which is responsible for producing new individuals is……system.

(digestive – nervous – reproductive)

3- The organ which is found in both of the respiratory and digestive systems is ……

(mouth – larynx – pharynx)

4- The stomach is ……

(a system – an organ – a cell)

5- Bile juice is secreted by …….

(liver – salivary glands – pancreas)

6- The digested food is absorbed in the ……

(larynx – ileum – duodenum)

7- The plants make their own food in the process of …….

(respiration – photosynthesis – circulation)

8- The food chain begins with ..... organisms.

(producers – consumers – decomposers)

9- The algae is from ……

(producers – consumers – decomposers)

10- From the examples of the producers ……

(fish – rabbit – bean)

11- It is found in the plant cell and not found in the animal cell……..

(nucleus – cytoplasm – chloroplasts)

12- In the digestive system, the stomach is followed by the .....

(esophagus – duodenum – ileum)

13- The ..... is an example of unicellular living organisms.

(frog – yeast fungus – snake)

14- Which of the following is considered as an organ ?

(bean plant – yeast fungus – heart)

15- The organ that turns food inside the mouth cavity and mixes it up with saliva is the .....

(esophagus – teeth – tongue)

16- All the following are considered as producers except .....

(bean plant – green algae – bread mould fungus)

17- During respiration process, gases exchange occurs in ....

(trachea – nose – alveoli)

18- ..... allows food to pass from pharynx to stomach .

(Mouth – Esophagus – Large intestine)

19- Digestion of protein starts in .....

(stomach – mouth – small intestine)

20- Plants make their food through process of photosynthesis in the existence of sunlight , water and .....

(nitrogen – carbon dioxide – oxygen)

21- The first part of small intestine is called .....

(pharynx – duodenum – stomach)

22- Bread mould fungus is from .....

(consumers – producers – decomposers)

23- Digested food is absorbed in the .....

(stomach – liver – small intestine)

24- The tissue is made up of a symmetric set of .....

(organs – cells – systems)

25- ……. is used in making bread.

(bread mould fungus – yeast fungus – amoeba)

26- Exhalation air contains …… gas and water vapour.

(oxygen – carbon dioxide – nitrogen)

27- Some means of transport that depend on engine pushing force on motion as ……

(cars – electric fan – electric motor)

28- Kite flies by …… pushing force.

(water – hand – wind)

29- The bicycle moves by using ……

(paddles – brakes – pulleys)

30- The sail boats move on the surface of river Nile by the pushing force of .....

(water – wind – ropes)

31- The measuring unit of the force is ……..

(meter – minutes – Newton)

32- The measuring unit of force is related to the scientist ……

(Faraday – Edison – Isaac Newton)

33- On rubbing your hands together, …… energy is produced .

(heat – electric – sound)

34- On rotating a spring, the energy produced is the ……

(potential energy – heat energy – electric energy)

35- From the non-renewable resources of energy ……

(coal and natural gas – wind and coal – wind and waterfalls)

36- There are two kinds of electricity which are …….

(static and thermal electricity – thermal and kinetic electricity – static and current electricity)

37- Static electricity is produced from ……

(flow of electric charges in wires - rubbing your hair by a plastic ruler –putting a rod of copper and zinc in a lemon)

38- The path of electric current is called ……
(battery – switch – electric circuit)

39- Washing machine and electric heater work by ……
(static electricity –current electricity – both of static and current electricity)

40- In dynamo, kinetic energy changes into …… energy .
(chemical – heat – electric)

41- Solar heaters change light energy into ..... energy .
(chemical – heat – sound)

42- The vibration of objects produces ……. energy.
(heat – light – sound)

43- In electric lamp, electric energy changes into …… energy .
(kienetic – heat – light)

44- …….. is a form of energy that reaches ear causing hearing.
(Light – Sound – Heat)

Question (2):

Write the scientific term :

1- A group of similar cells. [……..]

2- The building unit of the living organism's body .[……]

3- A process by which oxygen enters the lungs.[……..]

4- A form of energy that reaches to ear causing the hearing. [….]

5- A part of the small intestine where the digested food is absorbed. [……..]

6- A juice helps in digestion of fats, where it changes fats into fatty emulsion . [……..]

7-Living organisms that can make their own food by themselves through the process of photosynthesis. […….]

8- The process by which the green plant makes its own food. [….]

9- The organ that mixes food with saliva. [……]

10- The organ that closes the trachea during swallowing of food. [….]

11-The organ that secretes bile juice . [……]

12- The membrane that separates between thoracic cavity and abdominal cavity. [……]

13-The respiratory tube that is supported by incomplete cartilaginous rings that make it permanently open. [……..]

14- Living organisms depend on other living organisms in their food. […….]

15- The measuring unit of force . [……]

16- The ability to do work. [……]

17-The energy stored in a spring of a toy car . [……]

18- The main source of the energy on the Earth.[……]

19- The type of electricity that can be formed by rubbing. [……]

20-Electric charges that flow through connecting wires for long distances. [……..]

Question (3):

Complete the following statements :

1- The total number of teeth in adult is ……in each jaw .

2- Digestive canal supplementaries are salivary glands , …….. and ……

3- Digestion of proteins begins in …… and digestion of starch begins in ……..

4- The air sacs are surrounded by network of …….. in where gas exchange occurs.

5- Salivary glands are …….. pairs and secrete a liquid known as ……

6- Diaphragm moves ..... during inhalation and moves ..... during exhalation.

7- ..... can't make their own food and get their food through decomposing the organic wastes.

8- Lightning in the sky phenomenon is related to the ..... electricity.

9- The energy transmits in a form of food from a living organism to another one known as .....

10- In solar cells, ... energy changes into ..... energy .

11- Electric lift contains ..... that makes the motion easy .

12- Fishing tools contains ..... that transfer the motion .

13- In battery, ... energy is changed into ..... energy.

14- From renewable resources of energy are ..... and .....

15- From non-renewable resources of energy are ..... and .....

Question (4) :

Put (√) or (×) :

1- The organ consists of a group of tissues . ( )

2- Alveoli are found in trachea. ( )

3- The animal cells are surrounded by the cell wall. ( )

4- Grass eaters are producers. ( )

5-The iodine solution is used to detect the presence of sugar( )

6- The limewater is used to detect the presence of carbon dioxide gas. ( )

7- Digested food is absorbed in the stomach. ( )

8- The living organisms can't respire. ( )

9- Yeast fungus is unicellular organisms. ( )

10- Non-renewable energy is the energy that can't renew itself such as coal . ( )

11- To keep the respiratory system healthy, we should eat fruits rich in vitamin (c) . ( )

12-Trachea contains cartilaginous rings. ( )

13- Force is the ability to do work. ( )

14- When sun rays fall on a lens that put over a paper, the paper burned . ( )

15- It's preferred to use natural gas as a source of energy than using coal. ( )

16-Lightning in the sky is a phenomenon related to the static electricity. ( )

17- The moon is the main source of energy on the Earth's surface. ( )

18- In radio, the electric energy is changed into chemical energy. ( )

19- Nucleus controls the substances entering into the cell or leaving it. ( )

20- Decomposers have a great economical and environmental importance. ( )

21-Undigested food is assembled in the large intestine. ( )

22- Force is measured in kilogram unit. ( )

23- Sound is produced from the vibration of objects. ( )

24- The air enters the lungs through inhalation process. ( )

25- Consumers can make their own food by themselves through the process of photosynthesis. ( )

26- Gas exchange occurs in trachea. ( )

27- When rubbing the ruler by your hair, electric charges are formed on it that attracted the bits of paper to it. ( )

28- Sun is one of the main factors in the formation of fuel that is used in machines operation. ( )

Question (5) :

Choose from column (B) what suits in column (A) then write the letter of choice under the table :

(A)	(B)
1- Large intestine **2-** Pharynx **3-** The cell **4-** Lungs **5-** Liver **6-** Salivary glands	**a-** is secreted by liver to digest fats. **b-** secrete enzymes that digest starch. **c-** is a common cavity leads to the esophagus and trachea. **d-**is assembled the undigested food. **e-** is changing the food from a complex form into a simple one to let the body get benefited. **f-** are organs in the human respiratory system. **g-** is the building unit in an organism

(**1** - .....) (**2 -** .....) (**3 -** .....)

(**4 -** .....) (**5 -** .....) (**6 -** .....)

Question (6) :

Correct the underlined word in the following statements :

1- Gases exchange takes place in <u>trachea.</u> [.....]

2- Tissue is made up of a symmetric set of <u>organs.</u> [.....]

3- <u>The nucleus</u> controls the substances that enter or leave the cell. [.....]

4- <u>Consumers</u> are living organisms that get their food through decomposing the organic wastes. [.....]

5- Consumers can make their own food by themselves through the process of photosynthesis. [.....]

6- Absorption of food occurs in stomach. [.....]

7- Coal is considered as the cleanest type of fuel. [.....]

8- Light is produced from the vibration of objects. [.....]

9-In the electric heater, the electric energy is changed into chemical energy [.....]

Question (7) :

Rearrange the following words to form a food chain :

1- Aquatic insects – Big fish – Algae – Small fish.

[Starting with the producer (Algae)]

.....

2- Locust – Green plant – Snake – Hawk – Frog.

[Starting with the producer (Green plant)]

.....

Question (8) :

Give reason for each of the following :

1- Plant cells contain chloroplasts .

.....

.....

2- Eating orange and guava is important.

.....

.....

3- Green plants are called producers .

.....

.....

4- Nose has blood capillaries.

.....

.....

5- Liver helps in the digestion of fats.

.....

.....

6- All food chains begin with producers.

.....

.....

7- Decomposers have a great economical and environmental importance.

.....

.....

8- The green plants can't live without sunlight .

.....

.....

9- When passing electric current in the electric fan, it rotates.

.....

.....

10- Sun is necessary for human's life.

.....

.....

11- Attracting a balloon rubbed by the wool to a wall.

.....

.....

12- Gears are very important in machines.

.....

.....

13- The kite flies in the sky.

.....

.....

14- We hear a sound, when we tap the tuning fork .

.....

.....

15- Attraction of small bits of paper to a ruler rubbed by your hair .

.....

.....

Question (9) :

Mention the function of the following :

1- The salivary glands in the mouth .

.....

.....

2- The cilia in the trachea .

.....

.....

3- The tongue.

.....

.....

4- The epiglottis .

.....

.....

5- The liver .

.....

.....

6- The pulleys .

.....

.....

7- The gears .

.....

.....

8- The dynamo .

.....

.....

9- The motor .

.....

.....

10- The solar cell.

.....

.....

Question (10) :

Answer the following questions :

1- How do you keep the digestive system healthy ?

2- How do you keep the respiratory system healthy ?

3- What is the importance of decomposers ?

4- What are the benefits of solar energy ?

Model Exam (1)

Question (1) :

a- Complete the following statements :

1- The main source of heat and light on the surface of Earth is ……..

2- Ebb and tide can use in production of ……

3- Force is the effect that changes …… of the body from …….. to ……..

4- The organ which is found in both of the respiratory and digestive systems is …….

5- Green plants need ……. gas in photosynthesis process.

b- Give reason for the following :

1- Nose has blood capillaries.

2- When passing electric current through electric fan, it rotates.

Question (2) :

Write the scientific term for each of the following statements :

1- A part of the small intestine, where the digested food is absorbed [……]

2- The energy stored in a spring of a toy car. [……]

3- The gas which is necessary for respiration process and burning of fuel. [……]

4- A juice helps in digestion of fats and changes it into fatty emulsion. [……]

5- Living organisms depend on themselves on making their food. [……]

Question (3) :

Choose the correct answer from those between brackets :

1- From non-renewable sources of energy are……. :

(coal and natural gas – wind and coal – wind and waterfalls)

2- The stomach is ……

(a system – an organ – a tissue)

3- The algae are from ……..organisms.

(producers – consumers – decomposers)

4- It is found in plant cell and not found in animal cell :

(nucleus – cytoplasm – plastids)

5- Kinetic energy is changed into …… energy in dynamo.

(chemical – heat – electric)

Question (4) :

What happen in the following cases :

1- Removing of epiglottis from human.

2- Decomposers are not present in the nature.

3- Electricity is not present at homes.

4- Absence of Sun from Earth.

5- Teeth are not present in the mouth of human.

Model Exam (2)

Question (1)

a- Complete the following statements :

1- The longest part of the digestive system is……..

2- Electric fan rotates by the effect of …… energy.

3- In solar cells, …….. energy changes into electric energy.

4- Sound originates due to ……. of the objects.

5- The system that is responsible about production of new individuals is ……..

6- When spring is rotated, the produced energy is ……

b- Give reasons for the following:

1- Green plants are called producers.

2- Liver helps in the digestion of fats.

Question (2)

Write the scientific term for each of the following statements :

1- A process by which oxygen enters the lungs. [.....]

2- A process in which the green plant makes its own food . [.....]

3- The measuring unit of force. [.....]

4- The building unit of the living organism's body.[.....]

5- The ability to do work. [.....]

Question (3)

a- Choose the correct answer from those between brackets :

1- Food chain begins by ……..

(producers – consumers – decomposers)

2- The function of nervous system is ……

(digestion – sensation – excretion)

3- When rubbing your hands together it generates .....
(heat energy – electric energy – sound energy)

4- Digested food is absorbed in .....
(larynx – Ileum – duodenum)

5-The path of electric current called .....
(battery – key – electric circuit)

6-From examples of unicellular living organisms is.....
(frog – yeast fungus - snake)

b- Rewrite the following statements after correcting them :

1- Petrol and natural gas are from renewable resources of energy.

2- Rubbing of objects generate current electricity.

Question 4 :

a- Compare between each of the following :

Animal cell and plant cell.

Inhalation process and exhalation process.

b- Mention one function for each the following :

1- Green plastids.

2- Pancreas.

3- Battery in electric circuit.

4- Alveoli (air sacs).

المواصفات الفنيــة:

مقـاس الكتــاب :	٥٧ × ٨٢ سم
طبــع الـمتــن :	٤ لـــون
طبــع الغــلاف :	٤ لـــون
ورق الـمتـــن :	٨٠ جم أبيض
ورق الغـــلاف :	٢٠٠ جم كوشيه
عدد الصفحات بالغلاف :	١٤٠ صفحة

جميع حقوق الطبع محفوظة لوزارة التربية والتعليم داخل جمهورية مصر العربية

Well Engineering Enterprise